



Environmental Assessment

Indian Cove Equestrian and Hiking Trails

Proposed Action:

The National Park Service proposes to designate and improve five miles of equestrian and hiking trails in the Indian Cove area of the park. The purpose of this project is to enhance visitor experience and provide recreational opportunities in the Indian Cove area.

In November 1997, the National Park Service released a draft amendment to Joshua Tree National Park's General Management Plan, to serve as the Backcountry and Wilderness Management Plan for the park. As part of the amendment, the effects of equestrian use on park resources and visitor experience were examined. Several alternatives were considered. After lengthy public review and comment, and with involvement of representatives of the equestrian community and environmental community, the park outlined a trail plan that restricted equestrian use to designated trails and corridors. Many trails were designated that provide access to remote parts of the park from adjacent public lands already used by the equestrian community. Similar circumstances exist in the Indian Cove area, however, the Backcountry and Wilderness Management Plan postponed equestrian access issues in this part of the park until a later date. Since the implementation of the plan, managers at Joshua Tree National Park have conducted a lengthy public scoping process, and, in doing so, have determined that public will and desire exists for a small, supplemental network of equestrian and hiking trails in the Indian Cove area.

For further information, please leave your contact information at 760-367-5544.

Note to Reviewers and Respondents:

If you wish to comment on this Environmental Assessment, you may mail comments by April 7, 2003, to Superintendent, Joshua Tree National Park, 74485 National Park Drive, Twentynine Palms, CA 92277, Attn: Indian Cove Equestrian.

Comments submitted by electronic mail may be addressed to jotr_publiccomments@nps.gov and will be accepted through April 7, 2003. Please reference "Indian Cove Equestrian" in the subject line.

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1 Introduction

1.1 Purpose and Need

In 2000 the National Park Service (NPS), in concert with an informed and involved community, approved an amendment to Joshua Tree National Park's *General Management Plan* of 1996 to serve as the *Backcountry and Wilderness Management Plan* (BWMP) for the park. As part of the amendment, the effects of equestrian use on park resources and visitor experience were examined and evaluated. The BWMP provides for 253 miles of equestrian trails and trail corridors that traverse open lands, canyon bottoms, and dry washes. Many of these trails were designated to provide access to remote parts of the park from adjacent public lands used by the equestrian community. Similar circumstances exist in the Indian Cove area; however, this area's only equestrian access, as designated by the BWMP, is the Boy Scout trail, which traverses eight miles between the backcountry registration board in Indian Cove and the backcountry registration board adjacent to Park Route 12, one-half mile east of the Quail Springs picnic area.

Prior to the implementation of the BWMP, equestrian use in Indian Cove, like other areas of the park, was open and dispersed. A network of social trails was created over time, which still exists today. Many of the equestrian social trails that existed in other areas of the park were incorporated into the trail system defined by the BWMP. Due to an oversight in the planning process none of the existing trails in the Indian Cove area were incorporated into the BWMP.

This Environmental Assessment (EA) is necessary to determine and evaluate the potential environmental impacts for the establishment of an equestrian trail network within the Indian Cove area of Joshua Tree National Park, in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations of 1978, and the guidelines contained in DOI Manual 516 (DOI 1980), NPS-12 (NPS 1982), and NPS-77 (NPS 1991). Park managers, acting under the provisions of the Organic Act of 1916, have identified a need to provide the unique visitor experience afforded by equestrian use in this area.

1.2 Derivation of Impact Topics

Since the adoption of the 2000 BWMP, managers at Joshua Tree National Park have conducted a lengthy public scoping, and, in doing so, have determined that public will and desire exists for a small, supplemental network of equestrian trails in the Indian Cove area. Respondents to public scoping expressed both support for the proposed action, as well as concern that park resources are adequately protected. Input from respondents was utilized in focusing the environmental discussions, and ensuring that alternatives are compared on the basis of the most relevant topics. Most respondents overwhelmingly supported the addition of equestrian trails, and expressed their desire to ensure that wilderness experience and recreational opportunities were preserved in the Indian Cove area. Local Native American tribes expressed their desire that archaeological resources be preserved. Other park neighbors expressed that the park should not unduly impact flora or fauna, and that the park use particular caution in actions that could effect federally listed species.

The impact topics presented below were selected for review and consideration. These impact topics were identified based on federal laws, regulations, and orders; 2001 NPS Management Policies; and NPS knowledge of easily impacted resources. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

1.2.1 Included Impact Topic: Biotic Communities

NEPA mandates an examination of each proposed action's impacts on all components of affected ecosystems. NPS policy is to protect the abundance and diversity of the park's naturally occurring communities. The admittance of horses into marginally disturbed or previously undisturbed areas presents potential impacts to native plant communities, burrowing animals, and ground-nesting birds. Therefore, this EA will examine the impact to biotic communities of the proposed action and its alternatives.

1.2.2 Included Impact Topic: Species of Special Concern

The Endangered Species Act of 1973 mandates an examination of impacts on all species on the federal list of threatened or endangered species. Three federally listed species are potentially affected by the proposed action: (1) the desert tortoise (*Gopherus agassizii*), (2) rock pennyroyal (*Monardella robisonii*) (3) The Little San Bernardino Mountains gilia (*Linanthus maculata*). The Indian Cove area of Joshua Tree National Park has a particularly dense population of the desert tortoise; this EA must assess the potential impacts of the proposed action to tortoises in the area. *Monardella robisonii* has been documented in the Indian Cove area; the washes in the north part of Indian Cove are potential *Linanthus maculata* habitat; and an evaluation of environmental impacts to these species resulting from an equestrian trail in the area will be completed by this EA as well.

The State of California through its own Endangered Species programs maintains a list of Species of Concern. These are species whose population are known or suspected to be declining and who may at some point be candidates for state listing as threatened or endangered. A number of bird species are state-listed as Species of Concern and are known to occur in the Indian Cove area. Most prominent of these in the Indian Cove area is the LeConte's thrasher (*Toxostoma lecontei*). While no formal scientific studies of LeConte's thrasher have been conducted in the Indian Cove area, informal nest records and surveys done over a 20-year period suggest that Indian Cove has a significant nesting population of LeConte's thrasher.

Partners in Flight, an international bird conservation effort, publishes a Watch List, developed to highlight those birds of the continental United States not already listed under the Endangered Species Act, that most warrant conservation attention. It is both an early warning system for birds that may be at risk and a device to draw national attention to the general condition of our avifauna. There is no single reason why all of these birds are on the list - some are relatively common but undergoing steep population declines; others are rare but actually increasing in numbers. The worst cases, those that are both rare and declining, require immediate conservation action. As the name of the list implies, all of them should be "watched" or monitored wherever they occur. Numerous bird species on the Partners in Flight Watch List are known to occur in the Indian Cove area. These are shown in Appendix 3.

Joshua Tree National Park has been designated as an Important Bird Area by the American Bird Conservancy. For a site to be included as an Important Bird Area, it must, during at least some part of the year, contain critical habitat that supports (1) a significant population of an endangered or threatened species, (2) a significant population of a Watch List species, (3) a significant population of a species with a limited range, or (4) a significantly large concentration of breeding, migrating or wintering birds.

1.2.3 Included Impact Topic: Cultural Resources

The National Historic Preservation Act of 1966 (as amended), NEPA, NPS Management Policies, NPS-2 (Planning Process Guideline), and NPS-28 (Cultural Resource Management) call for the consideration of archeological resources in planning proposals. The Indian Cove Area contains archeological sites related to the late prehistoric period, from about A.D. 1000 to historic times, as well as historic sites. The proximity of these

sites to the proposed trail, and the potential impacts to the sites resulting from the proposal and its alternatives, will be examined by this EA.

1.2.4 Included Impact Topic: Wilderness Experience

The NPS wilderness management policies are based on statutory provisions of the Organic Act of 1916, the Wilderness Act of 1964, and legislation establishing individual units of the national park system. Joshua Tree National Park is a unit of the National Wilderness Preservation System, a site designated by Congress and legally protected as wilderness in perpetuity. The 2001 NPS Management Policies require the administration of NPS-managed wilderness areas for the use and enjoyment of the American people in such a manner that will leave them unimpaired for future generations. Sections of the proposed equestrian trail enter Joshua Tree National Park's designated wilderness; therefore, wilderness issues will be addressed as an impact topic in this document.

1.2.5 Included Impact Topic: Scenic and Recreational Values

Providing for visitor enjoyment is one of the fundamental missions of the NPS, according to the Organic Act of 1916 and the 2001 NPS Management Policies. The proposal to open equestrian trails in the Indian Cove area draws heavily from a commitment to this mission; therefore, the EA must evaluate the impacts to scenic and recreational values of the proposal and its alternatives.

1.2.6 Dismissed Impact Topic: Air Quality

The Clean Air Act of 1970 (as amended 1990) requires federal land managers to protect park air quality. NPS Management Policies call for air resource management to be integrated into NPS operations and planning, and for all air pollution sources within parks to comply with federal, state, and local air quality regulations. The generation of small amounts of fugitive dust from the construction and utilization of a new series of equestrian trails would have a minimal impact on the air quality of the 794,000-acre national park; therefore, this topic was dismissed from further analysis.

1.2.7 Dismissed Impact Topic: Socioeconomic Issues

Tourism associated with Joshua Tree National Park, currently averaging 1.25 million visitors each year, is economically important to the communities surrounding the park. Hotels, restaurants, grocery stores, and specialty shops cater to the different users of the park, including rock climbers, sightseers, campers, and equestrians. With 270 miles of trails and trail corridors already utilized by park visitors, the proposed action and its alternatives would not significantly affect the visitation to Joshua Tree National Park; therefore, socioeconomic issues will not be evaluated further in this EA.

1.2.8 Dismissed Impact Topic: Environmental Justice

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their policies on minorities or low-income populations and communities. Neither the proposal nor its alternatives would have health or environmental effects on minorities or low-income populations or communities; therefore, this topic will not be analyzed by the EA.

1.2.9 Dismissed Impact Topic: Water Quality

Quality and quantity of both ground and surface water remain a point of concern in the high desert environment that encompasses Joshua Tree National Park. Naturally occurring surface water is rare in the park. There are more than 120 known water sources, including springs, seeps, wells, and one short perennial stream. Flows from springs range from seasonal dampness to about seven gallons per minute. Two significant water sources, Johnson Spring and Sneakeye Spring, are located at the southern end of the Indian Cove

area. The proposed trails as outlined in this EA would never get closer than a mile to either spring. Also, the proposed trail's elevation is significantly lower than that of the water sources (maintaining at least 400 feet elevation differential), and the rocky terrain near the water sources would prohibit equestrian access. For these reasons, water quality will not be examined further in this EA.

2 Proposed Action and Alternatives

2.1 Proposed Action (Figure 2)

The NPS proposed action is to develop and designate new equestrian trails, starting at the Indian Cove Ranger Station at coordinates 34°07'12"N, 116°09'16"W. To the west, the new trail segment would cross the wilderness boundary at coordinates 34°07'12"N, 116°09'45"W and merge with the pre-existing Former Boy Scout Trail at coordinates 34°07'13"N, 116°10'18"W (Segment A). The Former Boy Scout Trail would be designated as a trail corridor under the corridor concept as outlined in the Backcountry and Wilderness Management Plan as this section exists primarily in a dry wash. Segment B meets the current Boy Scout Trail at coordinates 34°06'26"N, 116°10'42"W. The current Boy Scout Trail is already open to equestrian access, and leads east to a backcountry board on the Indian Cove Road, the local terminus for this eight-mile trail. A new equestrian trail segment would travel south-east from Indian Cove Road, at the point of terminus for the current Boy Scout Trail, crossing the wilderness boundary at coordinates 34°06'37"N, 116°08'57"W, and meeting the following trail network at coordinates 34°06'36"N, 116°08'54"W (Segment D).

To the east from the Indian Cove Ranger Station, a new trail segment would run southeast, crossing the wilderness boundary at coordinates 34°06'59"N, 116°08'57"W. The trail would traverse the west face of a pile of quartz monzonite boulders, intersecting with the continuation of the Boy Scout Trail at coordinates 34°06'37"N, 116°08'54"W (Segment C). The trail would continue around the south side of the boulder pile, eventually intersecting the dirt road at coordinates 34°06'17"N, 116°08'34"W (Segment E). Current management documents call for the removal of the dirt road, which leads from the terminus of the proposed equestrian trail system, south to the Rattlesnake Canyon Picnic Area. Under this proposal the park's General Management Plan would be amended to allow for equestrian and hiker use of the existing road (Segment F). The road would be rehabilitated from a two-track, back to a single-track trail.

This action would add 5.05 miles of trails to the park's designated equestrian and hiking trail system, with a corresponding surface disturbance of approximately 3.38 square acres (assuming a 3 foot wide trail footprint). Under this proposal, 4.26 miles (2.40 square acres) of existing social trails will be blocked and either actively reclaimed, or allowed to restore naturally (Social trails in Figure 5, and segment G from Figure 1).

2.2 Alternative A (Figure 3)

Alternative A would include everything mentioned in the proposed action, plus a complete loop around the quartz monzonite boulders. At coordinates 34°06'53"N, 116°08'55"W, the trail would bifurcate to the west and south. The additional spur would loop around the quartz monzonite boulders on the East Side, and would tie back into the proposed trail system at the terminus of the old dirt road (Segment G). This would provide for additional recreational and scenic opportunities in the Rattlesnake Wash area, and would provide opportunities for a loop trail on the East Side of the basin.

This action would add 6.75 miles of trails to the park's designated equestrian and hiking trail system, with a corresponding surface disturbance of approximately 6.00 square acres (assuming a 3 foot wide trail footprint). Under this proposal, 2.56 miles (.86 square acres) of existing social trails will be blocked and either actively reclaimed, or allowed to restore naturally.

2.3 Alternative B (Figure 4)

Alternative B would be similar to the proposed action, minus the spur trails that

circumnavigate the boulder pile. This would leave only the segments of trail that extend from the Indian Cove Ranger Station, the Boy Scout Trail, and the segment that connects the two along the west side of the boulder pile. The old road would be removed according to existing management plans.

This action would add 4.55 miles of trails to the park's designated equestrian and hiking trail system, with a corresponding surface disturbance of approximately 1.65 acres (assuming a 3 foot wide trail footprint). Under this proposal, 5.86 miles (4.54 square acres) of existing social trails will be blocked and either actively reclaimed, or allowed to restore naturally.

2.4 Alternative C, No Action

Alternative C is the no action alternative. No new equestrian trails would be developed or designated in Indian Cove.

2.5 Mitigation

Mitigation measures are analyzed as part of this proposal. These actions have been incorporated into the proposal to lessen the impacts of the proposal. These measures will be applied to the proposed action or to any other alternative selected to the appropriate degree.

2.5.1 Cultural Resources

Consultation with the State Historic Preservation Office will be conducted prior to field work. It is proposed that surface mapping of directly impacted archeological sites, surface collection of areas in the trail corridor, and limited test excavation be conducted prior to trail construction. A Discovery Plan will be in place in the event that any human remains are inadvertently discovered during ground disturbing activities. An archeologist will be present during trail construction within National Register of Historic Places (NR) eligible site boundaries. The archeologist will have the authority to halt any operation if any information surfaces that would indicate the presence of significant cultural resources. If possible, the trail will be routed around any identified archeological sites. Sites will be monitored periodically to determine impacts.

2.5.2 Desert Tortoise

The proposed project would take place in Mojave desert tortoise (*Gopherus agassizii*) habitat. Additional measures incorporated into the proposal to reduce impacts of the desert tortoise include:

- The NPS shall designate a field contact representative (FCR) who will be responsible for overseeing compliance for the desert tortoise. The FCR will coordinate with the U.S. Fish and Wildlife Service (FWS) and be authorized to halt any activity that may endanger desert tortoises.
- An authorized biologist or representative shall be present during all phases of trail construction.
- Only the biologist authorized by FWS shall be allowed to handle/relocate desert tortoise.
- A complete survey will be conducted prior to initiation of any segment of the project. All potential desert tortoise burrows will be identified. Where ever possible, the trail will be routed away from active tortoise burrows. Tortoise activity will be monitored to ensue that construction of the trail does not affect individual tortoises.

2.5.2a Habitat Reclamation

As part of the preferred alternative, the NPS will close and restore a minimum of 2.56

miles of social trails (depending on the alternative chosen) in the Indian Cove area (Figure 5). The continuity of the fence along the north boundary of the park in the Indian Cove area will be ensured. Unfenced areas will be fenced, to discourage additional trespasses.

2.5.3 Monitoring program

In accordance with the Backcountry and Wilderness Plan, monitoring of the trail system would become an ongoing process. If, during the monitoring process, it was determined that resource damage or conflicts between user groups was occurring, the National Park Service would have the authority to either close trails and corridors or to reroute trails to mitigate the damage and prevent future resource and visitor experience degradation. (Joshua Tree National Park, Backcountry and Wilderness Management Plan, P.32).

2.5.4 Nest Surveys

Nest surveys need to be established in the Indian Cove area to determine how trails and visitor use are affecting local bird populations. Surveys should be conducted in areas receiving equestrian and non-equestrian use as well as in areas of Indian Cove where little visitor use occurs. Surveys should be designed to concentrate on federal- and state-listed species as well as avian species on the Partners in Flight Watch List.

3 Affected Environment

3.1 Location

Joshua Tree National Park occupies 794,000 acres of the Mojave and Colorado Deserts of Southern California, approximately 140 miles east of Los Angeles (NPS 1996). The park lies along the east-west transverse ranges of the Little San Bernardino Mountains. The southern boundary of Joshua Tree National Park follows the base of these mountains along the northern perimeter of the Coachella Valley; the Morongo Basin defines the north boundary. The park lies in San Bernardino and Riverside counties. It is accessible from the south via Interstate 10, and from the north via Highway 62.

The main north entrances to the park, which connect and provide through access, are located at the village of Joshua Tree and at the city of Twentynine Palms. Between these two entrances, on the northern boundary of the park, is the only vehicular access point for Indian Cove.

Indian Cove Road leads south from Highway 62, six miles due west of the center of the city of Twentynine Palms. Indian Cove Road travels through a residential neighborhood before arriving at the park boundary, delimited by the San Bernardino Base Line. The road then enters Joshua Tree National Park at the Indian Cove Ranger Station, continues past the Boy Scout Trail Backcountry Board, and eventually enters Indian Cove Campground, a developed area with 101 family campsites, 13 group campsites, and a 0.6 mile nature trail. From the campground, Indian Cove Road has no outlet.

Indian Cove covers an area of slightly more than five square miles. Elevation at the park boundary is 2700 feet, rising in a southerly direction to 3200 feet in the southeast corner and to 3800 feet in the southwest corner. The area is relatively flat, with islands of quartz monzonite boulders erupting through the alluvium at various locations. It is cut by several main drainage channels, which originate in the surrounding quartz monzonite formation known as the Wonderland of Rocks, a geological formation surrounding the cove on the west and south. All drainages appear to have an initial flow from a southwest to northeast direction, and, finally emerging from the mountainous region, they assume an almost south-to-north orientation. No permanent streams exist, but two small springs, named Sneakeye Spring and Johnson Spring, do exist in the rock formation bordering the extreme southwest and southeast portions, respectively, of Indian Cove.

The park is in the process of accepting a donation of land adjacent to the north boundary of the park, in the Indian Cove area, and currently plans to incorporate the property in a minor boundary adjustment in 2003. The property includes a residence and a garage, and is otherwise in pristine condition. This property lies at the mouth of Rattlesnake wash, in the northeast corner of the Indian Cove area. Actions outlined in this EA would not impact the use of this facility.

As with the rest of Joshua Tree National Park, native desert plants and fauna, and spectacular geological features are important aspects drawing visitors to the Indian Cove area. Of the park's 794,000 acres, 585,040 are legislated wilderness—set aside for the preservation of natural, cultural, historic, and scenic resources. The Indian Cove area reflects this overall balance of frontcountry and backcountry uses, as the campground and road are closely surrounded by wilderness. The Boy Scout Trail, running eight miles between Indian Cove and Park Route 12, west of the Hidden Valley Campground spur road, is the major developed wilderness access trail in this area.

3.2 Biotic Communities

Two deserts, the Colorado and the Mojave, come together in Joshua Tree National Park. Indian Cove lies entirely within the higher, moister, and slightly cooler Mojave Desert. In

terms of desert vegetation, the *Larrea tridentata*-*Ambrosia dumosa* association dominates the area of the proposed action. At the northern boundary of Indian Cove, the creosote bush (*Larrea tridentata*) and the bur sage (*Ambrosia dumosa*) are also joined by a third dominant species, galleta (*Pleuraphis rigida*). The eastern portion of the proposed trail would pass through the *Yucca schidigera*-*Ambrosia dumosa* association, a transitional association between two plant communities, the yucca and the creosote. In addition, the eastern loop of the proposed trail would pass through a wash that drains Rattlesnake Canyon, an area rich in spring seasonals, particularly wildflowers.

Soils in the area are predominantly sandy, with select areas rich in cryptobiotic crusts. Crusts appear in various stages, some dominated by soil algae, others thicker with lichen present. Soil crusts serve a critical function in soil stabilization, water retention, and nitrogen fixation. Given the high winds that occur in the area, soil stabilization is important to both minimize wind erosion and reduce dust in the air.

It is estimated that approximately 350 vertebrate species inhabit the park. Large mammals in the area include desert bighorn sheep. The most common smaller mammals include the mouse and wood rat species, white-tailed antelope ground squirrel, chipmunk, pocket gopher, coyote, black-tailed jackrabbit, and cottontail rabbit. There are seven species of lizard and thirteen species of snake that inhabit the Indian Cove area, most of which are ground-dwelling. Over 270 species of birds live in or fly through the park, which is adjacent to a major migratory flyway in the Coachella Valley. The Indian Cove area has a relatively rich avifauna, including a year-round population of LeConte's thrashers, black-throated sparrows, verdins, mourning doves, mockingbirds, cactus wrens, and representative samples of most resident species. A number of species migrate into the area during the spring and stay until fall to nest and fledge their young, including ash-throated flycatchers and horned larks.

In the past, hikers and climbers in Indian Cove have had an impact on nesting species, in particular golden eagles and prairie falcons. Park managers have closed certain areas to park visitors during the nesting season to protect these raptors.

3.3 Species of Concern

3.3.1 Desert Tortoise

The desert tortoise, *Gopherus agassizii*, is listed as a threatened species by the FWS (50 CFR 17.11 & 17.12). Joshua Tree National Park is a designated Desert Wildlife Management Area (DWMA) under the 1994 Recovery Plan for the desert tortoise (Section II.B and E). As a DWMA, the NPS implements recovery actions to provide for the long-term persistence of viable desert tortoise populations (FWS 1994). The primary threats to the tortoise, identified in the Recovery Plan, include loss of habitat, habitat degradation (exotic weeds), mining, grazing, off-road vehicle use, and urban sprawl.

Karl (1988) estimated that the highest tortoise densities tend to occur in "creosote bush scrub where the topography was flat or rolling and the soil was fine-gravelly with or without boulder outcrops and scattered large gravel and cobbles". The majority of the habitat surrounding the area of the proposed equestrian trail fits within Karl's description. This information, taken together with Berry's (1984) density estimates, places the Indian Cove area as one of the most suitable and populated tortoise habitats in the northwest region of Joshua Tree National Park. In the past, Indian Cove has served as one of JOTR's main tortoise radio-tracking sites. At least ten animals were radio-tracked until 2000 and many more have been historically tracked or monitored in the area.

Approximately eleven and one half (11.5) kilometers of the proposed equestrian trails at Indian Cove were surveyed for the desert tortoise from September 5-September 19, 2002, by park biologist Pedro Chavarria. The survey was performed according to USFWS protocols for construction projects occurring in federal lands. Tortoise surveys are more representative of tortoise populations if they are conducted in the spring when tortoises

are most active. Due to the extreme drought, tortoises have likely been dormant for most of 2002 and would not have been producing visible sign on the surface. Any sign reported in this survey is likely under-representative of the actual tortoise population. The method used consisted of a 100% survey of the trail construction buffer zone, extending up to 50ft. from the trail edge on both East and West sides of the trail. All areas were surveyed for signs of tortoise presence, including burrows, scat and dead tortoises. When tortoise sign was found, additional surveys extending at a 50ft. perimeter from the tortoise sign were also conducted.

The results from the survey note that a considerable amount of tortoise sign was found within the 50ft. buffer zone on both sides of the proposed equestrian trail. Active burrows and recent sign of tortoise (i.e. type 1-3) were prevalent within the first 5m of the buffer zone. Most of the tortoise sign observed seems to be located within the vicinity of washes, alluvial fans, and concentrations of large rock outcrops.

No live tortoises were observed within the 50ft. buffer zone or within the 50ft. perimeter of tortoise sign discovered in the buffer survey. However, tortoises were active at Indian Cove during the period that these surveys were conducted; this is confirmed by tortoises sighted drinking water from the pavement on the road that leads to the group campground. These tortoises, one male and one female, came out for a short period of time for the duration of a short series of summer thunderstorms (Figure 6).

A total of 17 burrows were found in the proposed area with three active, seven recent, three less recent, and four indeterminate. Fourteen tortoise scats were found with four at least two weeks old, five less than a year old, and five more than a year old. Five pieces of tortoise remains were found including three scutes and four bones.

3.3.2 LeConte's Thrasher

The Indian Cove area contains a population of LeConte's thrasher, a California State Species of Concern and a Partners in Flight Watch List species. LeConte's thrashers are a non-migratory species with a limited range throughout the southwestern United States. The core of its range is in the California portion of the Mojave Desert, but nowhere throughout its range is it common. Densities even in optimum habitat are five pairs or less per square mile (Sheppard 1970), an extremely low density for any passerine bird. Many areas with seemingly suitable habitat lack this species (Remsen, Cardiff, and Cardiff MS).

No scientific studies of LeConte's thrashers have been conducted in the Indian Cove area so reliable population estimates are not available. Informal nest surveys carried out over the last 20 years suggest that portions of the Indian Cove area have nesting densities of LeConte's thrashers that may approach optimum levels.

Field surveys for LeConte's thrasher nests located in proximity to the proposed Indian Cove equestrian trails were carried out in September and October of 2002. Nesting activities typically occur from January to June so no active nests were found. LeConte's thrashers typically nest in large silver chollas (*Opuntia echinocarpa*) or pencil chollas (*Opuntia ramossissima*), or other dense shrubs such as jojoba (*Simmondsia chinensis*). Nests are usually located 2-6 feet off the ground. They are cup-shaped and are relatively loose aggregations of sticks. Nests are sometimes reused in subsequent years.

Figure 7 shows LeConte's thrasher nests located along the proposed trails. In addition, a number of currently used equestrian social trails that are not part of any of the proposed alternatives were also examined for LeConte's thrasher nests. Continued use of these social trails could exacerbate impacts of the proposed action on LeConte's thrashers and other nesting birds in the Indian Cove area.

3.3.3 Rare Plants

The Indian Cove area contains one rare perennial plant species and has potential habitat for a rare annual. Each of these species were former federal candidate species; with recent

changes to the U.S. Fish and Wildlife species lists, these two species were reduced to species of special concern. Neither are currently listed as candidate species, but both have sensitive status with state and California Native Plant Society lists.

Linanthus maculata is a former federally listed candidate species. It is a small annual herb that grows in very loose soft sand on low benches along washes, particularly in areas where the species does not have to compete with other plants. Major threats to *Linanthus maculata* include habitat loss, recreational activities, and off-highway vehicle use. Joshua Tree National Park remains one of the last protected habitats for this species. Because of development, most of the populations outside the park within the Coachella Valley have been extirpated. The California Native Plant Society has listed this species on the 1B List (rare, threatened, or endangered in California and elsewhere) with a RED code of 3-1-3 (Rarity: distributed in one to several highly restricted occurrences or present in such small numbers that it is seldom sited, Endangerment: endangered in a portion of its range, Distribution: endemic to California).

Monardella robisonii is a formerly federally listed candidate species. Rock pennyroyal, as the species is commonly known, is typically restricted to rocky, granitic slopes at moderate elevations, usually from 3400-4900 feet. A Joshua Tree National Park rare plants survey in the fall of 2001 found 17 new locations of the species in the Indian Cove management area, at elevations as low as 3200 feet. The habitat of *Monardella robisonii* is almost entirely in and around granitic boulders. Threats to this species include recreational activities. The California Native Plant Society has listed this species on the 1B List (rare, threatened, or endangered in California and elsewhere) with a RED code of 3-1-3 (Rarity: distributed in one to several highly restricted occurrences or present in such small numbers that it is seldom sited, Endangerment: not endangered, Distribution: endemic to California).

All portions of the proposed trail and alternative trail sections were surveyed for *Monardella robisonii* and *Linanthus maculatus*. The wash on the eastern portion of the proposed action is not appropriate habitat for *Linanthus*; the wash is fairly wide and appears subject to intense flow during storm events. Ideal habitat for this species is typically in gentler, braided washes. Surveys of the rare mint *Monardella* found no individual plants growing in the rock pile associated with the proposed action. This habitat is very different from areas further up in the cove where the species has been documented; the rock type is not granite but rather conglomerate in nature. Soils appear different, and associates typically found with *Monardella* (*Ericameria cuneata* and *Achnatherum speciosum*) were not present.

3.4 Cultural Resources

Cultural resources in the region of Joshua Tree National Park may reflect as much as 11,000 years of human use and occupation. This generalization has been made in the park's general management plan (NPS 1996). Such a statement is based upon the work of National Park Service archeologists, as well as those outside the agency, some of whom have done contract work for the park. Examples in the literature include NPS reports of 1975, 1985, and 1992. Other works are those of Elizabeth Campbell (1931), Elizabeth Campbell and William Campbell (1935), William Wallace (1964), Joan Schneider and Claude Warren (1992), Claude Warren and Joan Schneider (1992, 1993, 2000), and Adella Schroth (1994). Specific works dealing with Indian Cove and its related archeology include those of George Kritzman (1967), Richard Ervin (1985), and Claude Warren and Joan Schneider (1993).

Native American occupation of the Indian Cove area falls in the late prehistoric period, from about A.D. 1000 to perhaps historic times. Camps and rock shelters comprise the range of habitation sites found in Indian Cove. Other site types include hunting blinds, tool-reduction areas, quarries, and food processing areas. The park is well known for its pottery finds—vessel-bound food and water caches have been discovered in caves

and crevices throughout the park, including the Indian Cove region. Milling equipment abounds and was used to grind plant and animal materials. No evidence has yet been found in Indian Cove that would indicate an occupation earlier than A.D. 1000. This period, from A.D. 1000 to historic times, coincides with the greatest estimated overall occupation of the region now encompassed by Joshua Tree National Park, judging from the frequency of sites dating from within the last thousand years (NPS 1991, 1992).

At the time of European contact, the boundaries of three Native American groups – the Cahuilla, Chemehuevi, and Serrano – intersected at a point now in the park. The Cahuilla occupied southern and southwestern portions of the park; the Chemehuevi eastern portions; and the Serrano, northern and northwestern portions, including the area now known as Indian Cove (Bean 1978; Bean and Smith 1978; Bean and Vane 2002). Descendants of these peoples continue to live in the region and maintain cultural interests in the park. There are ongoing requests from Native Americans to gather plants for traditional uses and for visits to the park's curatorial facility to examine ethnographic items and archeological artifacts. The possibility exists of sacred sites being identified within the park (Schneider 1992) which would make consultation necessary. The major ongoing Native American concern relates to the possibility of discovering human remains; cremations have been found in the park in the past (Schroth 1992). The need would then exist to follow through with prompt notification and consultation with the neighboring tribes. The park staff, in concert with Native Americans, successfully completed repatriation of the remains of several Native Americans, associated grave goods, and objects of patrimony in June 1992. This was done in accordance with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), which would govern any future NPS action in this regard.

Known historic resources in the area are limited to roads, trash dumps, and rock features all probably from the 1900s.

A 1967 cursory archeological reconnaissance of the Indian Cove area recorded ten archeological sites during twenty-six days of fieldwork (Kritzman 1967). The campground, because of impending alterations, was subjected to the most intensive inspection; the remaining area received a less concentrated examination. Nevertheless, one of those ten recorded sites, CA-SBR-5767, was located near the eastern loop of the proposed series of equestrian trails. Two nearby transects inventoried more recently (Warren and Schneider, 1993) found three additional prehistoric sites, CA-SBR-7174, CA-SBR-7175, and CA-SBR-7176 and one historic trash scatter, CA-SBR-7196H.

In September and October of 2002 an archeological survey was completed for the entire proposed equestrian trail system (Sabala 2002). Fieldwork was conducted by Jan Sabala with the aid of Melanie Spoo, Cindy Von Halle, and Bill Trusdale. The entire trail was intensively surveyed to a width of 15m.

There were ten archeological sites and 34 isolated finds located and recorded during the survey. The various proposed alternatives would directly impact seven of these sites and the three additional sites are within the Area of Potential Effect (APE). There were five prehistoric sites, two historic sites, and three sites with both prehistoric and historic components identified. Three of the sites are most likely secondary surface deposits; one is a primary surface deposit; two of the sites have visible midden that indicates subsurface deposits; two of the sites have the distinct possibility of having subsurface midden deposits as indicated by either fire-affected rock or burnt bone; one site has a buried historic deposit; and one historic site is a two-track road.

CA-SBR-10,824, -10,827, and -10,828 are all in the same series of drainages and may be related secondary deposits washing down from the hills to the south. The linear nature of the survey precluded exploration of the drainages.

Isolated finds include lithics, potsherds, a quartz crystal, a battered pebble, a portable milling slab, and a dark soil layer in a drainage cut-bank, for a total of 34 items.

CA-SBR-5,767/H. This site was originally recorded by Kritzman in 1966 as a semi-permanent Native American campsite located on the west side of a wash. The site was relocated during this study and three loci and numerous features were recorded on a supplemental site record form. Locus 1 is in the north part of the site and consists mainly of bedrock milling slicks, two rock-lined pit features, a rock shelter with a rock semi-circle, and a circular rock ring. Locus 2 is the portion of the site recorded by Kritzman. It is in the south part of the site and is a midden deposit with lithics and potsherds. Locus 3 is located in the west portion of the site and is an historic trash scatter with clear, green, brown, and cobalt blue glass fragments; porcelain; and about 20-30 rectangular and round sanitary seam cans. White plastic, a metal twist-open can key, wire, round nails, metal crown caps, canning jar lid, and burnt bone were also noted. A two-track dirt road is on the west and north sides of Locus 3 and intrudes into the southern end of Locus 1. The site is in good condition except for an unauthorized equestrian-created trail that goes through it and is causing ground disturbance and erosion. Alternative A would authorize and utilize this trail.

CA-SBR-7196/H. This site was originally recorded in 1991 by Joan Schneider et al. as a small historic trash scatter composed of ceramics, records, bottle caps, rusted cans (sanitary seam type), key openers, coffee can lids, and glass. The site is located on the west side of a drainage. During the 2002 visit there was a prehistoric component recorded that consists of at least 104 flakes (58 rhyolite, 24 jasper, 17 chalcedony, and five fine-grained basalt) and two fire-affected rocks indicating a possible buried midden deposit. No potsherds were seen at the site. A dirt track runs north/south through the site. The historic scatter is located on the east side of the dirt road and the primary concentration of lithics is on the west side of the road, although flakes are present on both sides. The site is in good condition except for the dirt track road (CA-SBR-10,823H) that cuts through it; about five flakes were found in the road. The Proposed Action and Alternative A would authorize and utilize the dirt track as an equestrian route.

CA-SBR-10,823H. This site is a two-track dirt road that loops from the Sherman Highlands area up to the head of Rattlesnake Canyon and back out to the northwest. It is depicted on a 1944 and a 1937 map of the area and is associated with three known dump sites in the project area. This portion of the site is in good condition, however, the integrity of the entire route is in question. The Proposed Action and Alternative A would utilize this dirt track as a portion of the equestrian trail.

CA-SBR-10,824. This site is a very sparse lithic and potsherd scatter composed of a total of 11 potsherds (two are rim fragments) and 18 lithics. One quartz biface and two rhyolite cores were also included in this count. Lithic materials were predominantly rhyolite (11) but there were also two jasper flakes, one white chert flake, one brown chert flake with cortex, and three quartz (two flakes and one biface) artifacts. Part of the site is in a shallow wash and it is likely that sheet wash has carried many of the artifacts down from the mountains 3km to the south. Some of the potsherds have water-worn edges which further supports this theory. The boundaries of this site are not well defined to the north or the south due to the linear nature of the survey. There is an unauthorized equestrian-created trail that goes east/west through the western portion of the site. The site is in good condition except for the equestrian-caused trail in the western portion; the site appears to have no depth. The Proposed Action and Alternatives A and B would authorize the current western portion of the trail for equestrian use and sanction construction of the eastern portion.

CA-SBR-10,825. This site is a small, seldom-used vegetal processing site. It is composed of 12 artifacts: two definite, but faint, milling slabs; one possible milling slab, one unifacially worked flake, one quartz crystal, and seven flakes (one jasper, two white chert, four rhyolite). One of the definite milling slabs is on the west bank of a drainage and immediately south of the unauthorized equestrian trail and is in a precarious location. Sheet wash also threatens the site, which is currently in good condition. There does not

seem to be any midden or subsurface deposits. The Proposed Action and Alternatives A and B would authorize the current trail for equestrian use.

CA-SBR-10,826/H. There is a prehistoric and a historic component to this site. The prehistoric component consists of a north-facing rock overhang with a light midden, indicating subsurface depth. A light artifact scatter contains two chert flakes, two rhyolite flakes, one quartz flake, one jasper flake, four potsherds, one unburnt and six burnt bone fragments, and a milling slab. There is also a bedrock milling slick that served as the mapping datum. The probable historic components of the site are two rock alignments. One is a rock alignment, one course high, that extends across a small drainage. The other is a rock “retaining” wall on the west bank of the small drainage that is 1½ courses high and 2 thick. These two features don’t appear to have ever been functional. There is a drainage on the eastern edge of the site has washed away some of the deposits as evidenced by a small island of midden remaining. The site is in fair condition. The site is not directly in the path of the proposed trail but it is in the Area of Potential Effect (APE) for the Proposed Action and Alternatives A and B.

CA-SBR-10,827. This site is a ceramic and sherd scatter located along the currently authorized Boy Scout Trail. Due to the linear nature of the survey site boundaries are not well defined north or south of the trail. The site extends into three drainages and across two ridges. The western-most drainage had almost exclusively sherds in it and the ridges tended to have more flakes than sherds. The site has a sparse scatter with an artifact every 10 to 20m for a total of about 125 artifacts (ca. 50 potsherds and 75 flakes). Flakes were predominantly rhyolite, but there are jasper and chert flakes as well. The wide shallow washes draining north through the site may be responsible for secondary deposition of many of the artifacts. Many of the sherds have water-worn edges which supports this theory. The site is in good condition. The trail is currently an authorized hiking and equestrian route. This site is in the APE of the Proposed Action as well as Alternatives A and B as additional traffic would be directed to the Boy Scout Trail and across this site.

CA-SBR-10,828. This site is a very sparse surface lithic and sherd scatter composed of a total of 14 artifacts (six potsherds, six rhyolite flakes, one edge-modified rhyolite flake, and one tan and pink “chert” flake). Part of the site is in a shallow washy area and it is likely that sheet wash has carried many of the artifacts down from the mountains to the south. Some of the potsherds have water-worn edges which further supports this theory. The boundaries of this site are not well defined to the north and south due to the linear nature of the survey. There is an unauthorized equestrian-created trail that goes east/west through the site. The site is in good condition except for the trail running through the site. The Proposed Action and Alternatives A and B would authorize the current trail for equestrian use.

CA-SBR-10,829H. This site is an historic trash scatter that may date to about the mid-1900s. A cluster of artifacts is partially buried in the drainage bank in the northeastern part of the site and some are scattered on a rise to the southwest. Artifacts consist of several sanitary seam tin cans; a green speckled granite ware cooking pot and handle; clear, brown, and lime green glass; light green thick flat glass; white porcelain; black plastic; and small pieces of milled wood. The site is in fair condition as there are partially buried artifacts that are washing out of the drainage bank and most of the cans are badly rusted and decomposed. The proposed equestrian trail does not go through the site, which is about 100m to the east of the Proposed Action and Alternative A route. The site is, however, in the APE of the Proposed Action and Alternative A.

CA-SBR-10,830. The site is probably a short-term Native American campsite. It consists of a sparse lithic scatter with at least 74 flakes (46 quartzite, 25 jasper, and three chert); there were no potsherds at the site. Also noted were a large quartz chunk and a burnt bone indicating a possible buried midden. A dirt track (CA-SBR-10,823H) runs north/south through the site; about 20 of the flakes were located in the road. The site is in good condition. The Proposed Action and Alternative A would utilize the old road as a

designated equestrian trail.

3.5 Wilderness Experience

Congress has designated approximately 75 percent of Joshua Tree National Park as wilderness. On October 20, 1976, PL 94-567 designated 429,690 acres as wilderness areas and 37,550 acres as potential wilderness or wilderness study areas in the monument. On October 31, 1994, PL 103-433 designated an additional 163,000 acres of wilderness. According to the Wilderness Act, wilderness is defined as an area "...where the earth and its community of life are untrammelled by man." Management of the wilderness sections of the park complies with the Wilderness Act of 1964 and NPS management policies. Subject to certain exemptions, use of motor vehicles or other motorized equipment, landing of aircraft, and construction of structures and roads are prohibited in wilderness areas.

Wilderness attributes include naturalness, special features, minimum size of 5000 acres, and "...outstanding opportunities for solitude or a primitive and unconfined type of recreation." Opportunities for primitive and unconfined recreation experience are defined as "...activities that provide dispersed, undeveloped recreation which does not require facilities or motorized equipment" (BLM 1991). In 2000, the NPS, with involvement from affected communities, finalized an amendment to Joshua Tree National Park's General Management Plan, the Backcountry and Wilderness Management Plan. This amendment approved a system of trails and trail corridors following topographic features, amounting to 270 total miles of access in the park's backcountry. Equestrian access is provided by 253 of these miles. Under this plan, the only equestrian trail in the Indian Cove area is the Boy Scout Trail, running eight miles between Indian Cove and Park Route 12, west of the Hidden Valley Campground spur road.

The proposed action and its alternatives, with the exception of the no action alternative, plan to establish several segments of the equestrian trail in designated wilderness (refer to maps). Note that the true wilderness boundaries, designated by PL 94-567 on October 20, 1976, are marked on the maps by light green lines. The areas immediately adjacent to Indian Cove Road are not designated wilderness; the areas to the west and to the east of the vertical green lines are designated wilderness. The proposed action and Alternatives A and B plan to establish new equestrian trails in wilderness areas. A section of the Former Boy Scout Trail is included in this trail network extending into wilderness. The Former Boy Scout Trail is not a trail as designated by the Backcountry and Wilderness Management Plan.

3.6 Scenic and Recreational Values

The NPS is mandated by the Organic Act of 1916 and by its own Management Policies of 2001 to "provide for the enjoyment" of its visitors, while simultaneously "preserving unimpaired for future generations" the resources in its administration. In 2002, the number of visitors to Joshua Tree National Park is expected to exceed 1.25 million.

Popular activities in Indian Cove, and throughout the park, include hiking, picnicking, rock climbing, interpretive walks and talks, camping, and horseback riding. In terms of total visitor capacity, Indian Cove Campground is the largest campground in Joshua Tree National Park, with 101 family campsites and 13 group campsites. The Indian Cove Campground accepts reservations, and provides a relatively primitive camping experience, with pit toilets and no water provided within the campground.

There are two recognized, developed, and designated trails originating in the Indian Cove area. The Boy Scout Trail begins at the backcountry board on Indian Cove Road and travels eight miles through wilderness to the backcountry board accessible from Park Route 12, 0.5 miles east of the Quail Springs picnic area. This trail is open to hikers and equestrians. Additionally, a 0.6 mile interpretive nature trail begins from the southwestern

edge of the campground. This trail is open to hikers only.

The proposed action and alternatives A and B would establish equestrian and hiking trails accessible both from the Indian Cove Ranger Station, at the north boundary of the park on Indian Cove Road, and from the Boy Scout Trail Backcountry Board, where a small parking area exists.

4 Environmental Consequences

4.1 Biotic Communities

4.1.1 Proposed Action

A series of developed and designated equestrian trails in the Indian Cove area might result in an impact to native vegetation. Specifically, the movement of non-native species such as red brome, cheatgrass, and Moroccan mustard would be facilitated by increased use in these areas. The possibility exists for non-native seeds to travel on the bodies and in the scat of horses as well as via the shoes and socks of hikers that may also use the trail. Soil crusts will be impacted in the immediate vicinity of the trail. Increased use in the area may increase dust levels, particularly during dry periods.

Low-nesting or ground-nesting birds will be impacted by increased equestrian use. Ash-throated flycatchers nest in dead yucca stumps often only a foot off the ground. Horned larks are a very vulnerable ground-nesting species, as are black-throated sparrows. Most of the vegetation in the Indian Cove area is low-growing, and therefore, nests of LeConte's thrashers, roadrunners, and mockingbirds would be shoulder-high or lower to any passing horse. The nests of raptors would be largely unaffected, as they are maintained in the extreme southern section of Indian Cove, on the boundary of the Wonderland of Rocks, an area not included in the proposed action.

Burrowing and ground-dwelling animals, such as white-tailed antelope ground squirrels, pocket gophers, cottontail rabbits, and various species of lizards and snakes, will be exposed to increased habitat stresses as a result of increased horse use.

Conclusion: Establishing well defined, viable equestrian trails will greatly lessen the impacts associated with dispersed equestrian use that was prevalent prior to 2000. The NPS would have to mitigate the impacts to biotic communities in several ways. First, an ecologist would walk the paths of new equestrian trails with trail crews, to ensure that trails are not encroaching upon already-established burrows or nests. Second, all equestrian trails will be designated, developed, and marked before the network of trails is opened, to minimize the potential impacts. Trail crews will focus on creating viable and well-defined equestrian trails and corridors that minimize disturbance to the area.

The NPS will monitor trails, once in place, for the presence of exotic species, and interactions with park wildlife. The NPS will monitor the use of the trail system, and will establish use limits or remove trails if park resources decline, and equestrian use is found to be the cause.

4.1.2 Alternative A

The addition of equestrian and hiking trails introduces a greater potential impact to native plant species because there is 1.7 additional miles of trail exposed to increased equestrian traffic. Similarly, for ground-nesting, ground-dwelling, and burrowing species, there is slightly greater potential impact because the trails cover a larger distance. The concerns along the new section of equestrian trails remain the same as in section 4.1.1.

Conclusion: Establishing well defined, viable equestrian trails will greatly lessen the impacts associated with dispersed equestrian use that was prevalent prior to 2000. The NPS would again mitigate the impacts to biotic communities in the following ways. (1) An ecologist would walk the path of new equestrian trails to ensure that trails are not unnecessarily encroaching upon already-established burrows or nests. (2) All equestrian trails will be developed and marked before the network of trails is opened, with a focus on well-defined routes and corridors.

4.1.3 Alternative B

The reduced network of equestrian and hiking trails introduces less potential impact to native plant species because there is .5 fewer miles of trail exposed to increased equestrian traffic. Similarly, for ground-nesting, ground dwelling, and burrowing species, there is slightly less potential impact because the trail covers a shorter distance. The concerns along the new section of equestrian trails remain the same as in section 4.1.1.

Conclusion: Establishing well defined, viable equestrian trails will greatly lessen the impacts associated with dispersed equestrian use that was prevalent prior to 2000. The NPS would again mitigate the impacts to biotic communities in the following ways. (1) An ecologist would walk the path of new equestrian trails to ensure that trails are not unnecessarily encroaching upon already-established burrows or nests. (2) All equestrian trails will be developed and marked before the network of trails is opened, with a focus on well-defined routes rather than wide trail corridors.

4.1.4 Alternative C, No Action

The no action alternative would not introduce any potential impacts to the biotic communities of Indian Cove.

4.2 Species of Concern

4.2.1 Proposed Action

Additional equestrian trails in the Indian Cove area would increase impacts in marginally disturbed and previously undisturbed tortoise habitat. A literature review by Boarman (2002) discusses several threats that livestock may pose to desert tortoises: these include trampling of tortoises, trampling of tortoise burrows, soil compaction, spread of invasive plants through seeds transported on the bodies of ungulates, and increased dust levels. The cove population is severely effected by upper respiratory tract disease; it is possible that increased dust levels could exacerbate this condition. *Bromus rubens* and *Bromus tectorum* can outcompete native species for water in the Great Basin Desert (Eissenstat and Caldwell 1988, Melgoza and Nowak 1991), and *Bromus rubens*, *Schismus* spp., and *Erodium cicutarium* compete with native annuals for soil nitrogen in the Mojave Desert (Brooks 1998). Reduced abundance and diversity of native annual plants can deprive desert tortoises of important forage. Effects may include reduced availability of preferred food plants, loss or reduction of available nutrients and trace elements, and change in seasonal availability of plant foods (Nagy et al. 1998, Brooks and Berry 1999).

All of these threats are likely to occur to tortoises at Indian Cove but the degree of impact each of these threats may impose on tortoises is difficult to determine; no formal or informal studies have been conducted on the impacts that historical equestrian use at Indian Cove has had on tortoises. Furthermore, it is difficult to estimate how many horses will pass through the trails and how often this equestrian trail will be used. Although the park has established horse trails and horse camps, the park does not keep records of the number of horses that are brought to the park throughout the year. If the addition of equestrian trails as outlined in this EA brings a dramatic rise in visitation to areas that are currently sparsely used, then it is possible that significant impacts to tortoises may result from long-term repeated use through the creosote scrub habitat. If the addition of trails does not bring a substantial rise in visitors to the area, the impacts to tortoise populations could be minimal. Many of the impacts that Boarman (2002) notes may only be discovered and documented if baseline data exists with which one can compare impacts from repeated equestrian/ungulate use. The park would benefit from extensive monitoring of the Indian Cove area, and it is recommended that park staff conduct long-term monitoring of tortoise behavior as well as document changes in the quality of the surrounding tortoise habitat.

It is also difficult to estimate how many tortoises may be affected by the proposed action or any of the alternatives since all tortoises in this area were dormant for most of 2002. Surveys should be conducted in the spring when tortoises are most active. Tortoise sign

was found on all segments of the proposed trails indicating the entire area is desert tortoise habitat. Segments A and B contained one recently active tortoise burrow, two less recent burrows, and one possible tortoise burrow in bad condition. Three tortoise scats found on these segments ranged from less than a few weeks old to a few months old and a year old. Segments C and D also contained numerous tortoise sign including tortoise tracks, one active burrow, two recently active burrows, one less recent burrow, two scats less than one month old and one scat a year old. Segment F has not been surveyed.

It is not known how the present levels of equestrian use in the Indian Cove area impacts nesting birds. Low to moderate levels of disturbance due to trampling, noise, contact with shrubs and other vegetation are likely to be occurring now. Unknown, but likely, future increases in the amount of equestrian use may cause additional impacts to local nesting birds including the LeConte's thrasher. Long-term nest surveys will be needed to adequately evaluate and manage the impacts of future equestrian use in the area.

The proposed action would not introduce any new potential impacts to the rock pennyroyal (*Monardella robisonii*), or the Little San Bernardino Mountains gilia (*Linanthus maculatus*).

Conclusion: Establishing well defined, viable equestrian trails will greatly lessen the impacts associated with dispersed equestrian use that was prevalent prior to 2000. Impacts to desert tortoises by the proposed action include possible trampling of tortoises, trampling of tortoise burrows, soil compaction, and spread of invasive plants. It is unknown how many tortoises will be affected, however, since impacts will be confined to well defined trails, the impacts will be far fewer than dispersed use.

The park will employ trail construction that will reduce the potential for spread of exotic grasses, and will route trails away from existing tortoise burrows. A biologist will monitor trail construction to ensure individual tortoises and tortoise burrows are not effected. Resources management will periodically monitor the horse trail for tortoises—making sure that those individual tortoises that make burrows close to the trail edge are not heavily impacted by repeated equestrian use. The quality of the surrounding tortoise habitat will be assessed for soil compaction and invasive weeds as well. Long term monitoring of use and adjacent resources will be conducted as outlined in the previous section.

4.2.2 Alternative A

Alternative A would create an additional trail segment approximately 1.7 miles long, adding to the overall impact in tortoise habitat. Increased impacts would include possible trampling of tortoises, trampling of tortoise burrows, soil compaction, and spread of invasive plants through seeds transported on and in the bodies of horses.

One recently active tortoise burrow and one possible tortoise burrow were found on this segment along with tortoise scutes and bones. Although the amounts of tortoise sign are not high on this trail segment, it is confirmed tortoise habitat.

Unknown, but likely, future increases in the amount of equestrian use may cause additional impacts from trampling, noise, contact with shrubs and other vegetation to local nesting birds including the LeConte's thrasher. Long-term nest surveys will be needed to adequately evaluate and manage the impacts of future equestrian use in the area.

Alternative A would not introduce any new potential impacts to the rock pennyroyal (*Monardella robisonii*), or the Little San Bernardino Mountains gilia (*Linanthus maculatus*).

Conclusion: Impacts to desert tortoises by the alternative A would include possible trampling of tortoises, trampling of tortoise burrows, soil compaction, and spread of invasive plants over an additional 1.7 miles of trail. It is unknown how many tortoises will

be affected however, since impacts will be confined to well defined trails, the impacts will be far fewer than dispersed use.

Resources management will periodically monitor the horse trail for tortoises—making sure that those individual tortoises that make burrows close to the trail edge are not heavily impacted by repeated equestrian use. The quality of the surrounding tortoise habitat should be assessed for soil compaction and invasive weeds issues as well.

4.2.3 Alternative B

Alternative B would create .5 mile less trail than the proposed action, reducing the overall impact in tortoise habitat. Alternative B would introduce the same impacts to tortoises as the proposed action on sections A, B, C and D.

Unknown, but likely, future increases in the amount of equestrian use may cause additional impacts from trampling, noise, contact with shrubs and other vegetation to local nesting birds including the LeConte's thrasher. Long-term nest surveys will be needed to adequately evaluate and manage the impacts of future equestrian use in the area.

Alternative B would not introduce any new potential impacts to the rock pennyroyal (*Monardella robisonii*), or the Little San Bernardino Mountains gilia (*Linanthus maculatus*).

Conclusion: Impacts to desert tortoises by the alternative B would include possible trampling of tortoises, trampling of tortoise burrows, soil compaction, and spread of invasive plants. It is unknown how many tortoises will be affected however, since impacts will be confined to well defined trails, the impacts will be far fewer than dispersed use.

Resources management will periodically monitor the horse trail for tortoises—making sure that those individual tortoises that make burrows close to the trail edge are not heavily impacted by repeated equestrian use. The quality of the surrounding tortoise habitat should be assessed for soil compaction and invasive weeds issues as well. Long term monitoring of both use and adjacent resources will be performed, as outlined in the preceding section.

4.2.4 Alternative C, No Action

The no action alternative would not introduce any new potential impacts to the desert tortoise (*Gopherus agassizii*), LeConte's thrasher (*Toxostoma lecontei*), rock pennyroyal (*Monardella robisonii*), or the Little San Bernardino Mountains gilia (*Linanthus maculatus*). However, continued dispersed use along the existing network of social trails, and other as yet impacted lands by both hikers and equestrians would greatly impact each of the above listed species.

4.3 Cultural Resources

4.3.1 Proposed Action

The proposed action would directly impact six of the ten sites identified during the survey: CA-SBR-7,196/H, 10,823H, -10,824, -10,825, -10,828, and -10,830. Four additional sites are in the APE, with the boundary of site CA-SBR-5,767/H being directly adjacent to trail. Under the proposed action, short and long-term adverse impacts to archeological resources would occur. Short-term impacts would be associated with construction activity to create the trails. Mitigation measures would be designed with SHPO and a professional archeologist would monitor the sites during construction. Long-term impacts would result from increased visitor access and use of the trails.

4.3.1a Sites Directly Impacted:

CA-SBR-7,196/H. The dirt track that runs north/south through this Native American site is proposed for use as part of the equestrian trail. Effects of the trail would likely

be disturbance to a depth of about 10cm in the immediate tread. The trough caused by trail use would encourage rain water to channelize and cause further erosion. If one of the tracks were to be rehabilitated, as suggested in Section 2.1 of this EA, it would cause further subsurface disturbance to the site. Casual surface collection may occur as this route receives more traffic.

Although no midden was noted, there were two fire-affected rocks that could indicate a buried deposit. The fact that no pottery was seen could mean that this is earlier than most known sites in the park. This site has the potential to be eligible for the National Register of Historic Places (NR) under criterion d. Therefore, if this alternative is chosen, surface mapping and artifact collection should be conducted in the corridor of proposed disturbance. Archeological testing should also be conducted in the impacted area to discern if there is a buried deposit and to help determine the time period of the site.

CA-SBR-10,823H. This site is an historic road depicted on maps at least as early as 1937. The portion of concern is a relatively undisturbed 1.2 kilometer two-track section that runs north/south. Designation of this dirt road as an equestrian trail would likely result in disturbance to a depth of about 10cm in the immediate tread with associated erosion probable. If rehabilitation of one of the treads is conducted, as suggested in Section 2.1 of this EA, a thorough search of historical records is recommended. The road is not likely to be eligible to the NR, however, documentation of this research should be submitted to SHPO for concurrence.

CA-SBR-10,824. This is a very sparse scatter of lithics and potsherds. It is likely a secondary surface deposit that has been carried down the washes and deposited in the recorded location. There is currently no unauthorized equestrian trail existing within the eastern portion of this site. Effects of utilizing the existing portion of the trail and creating a trail in the eastern part of the site would likely be disturbance to a depth of about 10cm in the immediate tread with possible associated erosion occurring. Casual surface collection may occur as this route receives more traffic. This site is probably not eligible to the NR. To verify this supposition subsurface archeological testing similar to that specified in the programmatic California Archeological Resource Identification and Data Acquisition Program (CARIDAP) for light lithic scatters is recommended.

CA-SBR-10,825. This is a very sparse scatter of lithics and milling slabs that has an unauthorized equestrian-created trail running east/west within the boundaries. Effects of sanctioning the trail would likely be additional disturbance to a depth of about 10cm in the immediate tread with possible associated erosion occurring. Casual surface collection may occur as this route receives more traffic. It is probable that this site is not eligible to the NR. To verify this supposition subsurface archeological testing similar to that recommended in the CARIDAP is recommended.

CA-SBR-10,828. This is a very sparse scatter of lithics and potsherds that has an unauthorized east/west running equestrian-created trail within the boundaries. It is likely a secondary surface deposit that has been carried down the washes and deposited in the recorded location. Effects of sanctioning the trail would likely be additional disturbance to a depth of about 10cm in the immediate tread with possible associated erosion occurring. Casual surface collection may occur as this route receives more traffic. This site is probably not eligible to the NR. To verify this supposition subsurface archeological testing similar to that specified in the CARIDAP is recommended.

CA-SBR-10,830. The dirt track that runs north/south through this Native American site is proposed as a segment of the equestrian trail. Effects of this use would likely be disturbance to a depth of about 10cm in the immediate tread with associated erosion probable. Casual surface collection may occur as this route receives more traffic. If one of the tracks of the dirt road were to be rehabilitated, as noted in Section 2.1 of this EA, further disturbance would be created.

Although no midden was noted, there was a burnt bone found that could indicate a

buried midden deposit. The fact that no pottery was seen could mean that this is earlier than most known sites in the park. This site has the potential to be eligible for the National Register of Historic Places (NR) under criterion d. Therefore, if this alternative is chosen, surface mapping and artifact collection should be conducted in the corridor of proposed disturbance. Archeological testing should also be conducted in the impacted area to discern if there is a buried deposit and to what period the site might belong.

4.3.1b Sites in the APE but Not Directly Impacted

Four sites are in the APE and would not be directly impacted by the proposed equestrian trail. These are CA-SBR-5,767/H, -10,826/H, 10,827, and -10,829H. CA-SBR-5,767/H and -10,826/H are probably eligible to the NR under criterion d; CA-SBR-10,827 and -10,829H are probably not eligible. As these sites are in close proximity to the proposed trail additional traffic would enhance the potential for casual surface collection.

CA-SBR-10,827, however, is in the currently designated Boy Scout Trail and would receive increased use as more traffic is channeled into the trail. Effects to this particular site would likely be additional disturbance to a maximum depth of about 10cm in the immediate tread with increased erosion possible.

4.3.1c Previously Recorded Sites Not Relocated

The previously recorded sites CA-SBR-7174, -7175, and -7176 were not relocated during this survey. CA-SBR-7175 and -7176 were not looked for and CA-SBR-7,174 was searched for but not discovered. It is unlikely that these sites would receive any damage as a result of trail designation. They are in or across a drainage, away from the trail, and do not invite exploration; they are not considered to be within the APE.

Cumulative Impacts: The proposed action would contribute to the impacts of other past, present, and reasonably foreseeable future actions. Some archeological resources at Joshua Tree National Park have been adversely impacted from past construction disturbance associated with various projects. Some of these impacts have perhaps occurred before establishment of the park and/or as a result of inadvertent impact prior to legal requirements for archeological survey, site protection, and mitigation. Other current and foreseeable construction projects in Indian Cove have the potential to cause cumulative impact to archeological resources as a result of increased visitor use. The impacts of other actions, in conjunction with the impacts of the preferred alternative, would result in minor long-term adverse cumulative effects to archeological resources.

Conclusion: Archeological surface mapping, surface collection in areas directly impacted by the trail, and limited test excavations should be conducted for all sites directly impacted by trail designation; all work would be planned in consultation with SHPO. Monitoring of construction activities within sites shall be conducted. Monitoring of directly impacted eligible sites, as well as those within the APE, should also be conducted a periodic basis to determine if damage is occurring.

4.3.2 Alternative A

This alternative would directly impact seven of the sites, CA-SBR-5,767/H, -7,196/H, -10,823H, -10,824, -10,825, -10,828, and -10,830. Effects would be the same as in the Proposed Action with the addition of site CA-SBR-5,767/H to the list of those directly affected.

CA-SBR-5,767/H. This is the most complex site in the area with three separate loci: a milling area, a midden deposit with a moderate artifact scatter, and an historic dump. The proposed trail would run east/west through the site between major concentrations and along the western edge of the site. The existing unauthorized trail is causing soil disturbance to a depth of about 10cm and erosion is likely to continue if the trail is sanctioned. Increased use of the area might result in surface collecting at the site. This site is most likely eligible to the NR under Criterion d. If this alternative is chosen,

consultation with SHPO is recommended to develop a research design for test excavations to mitigate the impacts.

4.3.2a Sites in the APE but Not Directly Impacted

There are three sites not directly affected but which are within the APE, CA-SBR-10,826/H, -10,827, and -10,829H. CA-SBR-10,826/H is likely eligible to the NR under criterion d while CA-SBR-10,827 and 10,829H are probably ineligible. As these sites are in close proximity to the proposed trail additional traffic would enhance the potential for casual surface collection; sites should be monitored periodically.

4.3.2b Previously Recorded Sites Not Relocated

The previously recorded sites CA-SBR-7174, -7175, and -7176 were not relocated during this survey. CA-SBR-7175 and -7176 were not looked for and CA-SBR-7174 was searched for but not discovered. It is unlikely that these sites would receive any damage as a result of trail designation. They are in or across a drainage, away from the trail, and do not invite exploration; they are not considered to be within the APE.

Cumulative Impacts: These effects would be the same as for the proposed action.

Conclusion: This alternative is the most impactful to archeological sites. Archeological surface mapping, surface collection in areas directly impacted by the trail, and limited test excavations should be conducted, in consultation with SHPO, for all sites directly impacted by trail construction. Monitoring of directly impacted sites, as well as those within the APE, should be conducted on a periodic basis to determine if damage is occurring.

4.3.3 Alternative B

This alternative would directly effect three of the ten identified sites: CA-SBR-10,824, -10,825, and 10,828. There would be two sites that would be in the APE: CA-SBR-10,826/H and -10,827. Effects would be the same as those discussed in the Proposed Action.

Cumulative Impacts: These effects would be the same as for the proposed action.

Conclusion: Alternative B would only have a direct effect on three sites, two of which are probably ineligible secondary surface lithic and potsherd scatters. The third, CA-SBR-10,825, is in a primary context but artifacts are limited. Archeological surface mapping, surface collection in the direct area of the trail, and limited testing should confirm this supposition. Monitoring of directly impacted eligible sites and of the two sites in the APE should be conducted on an annual basis to determine if damage is occurring.

4.3.4 Alternative C, Action

The no action alternative would not result in any new impacts to cultural resources in the area from the trail project. However, site CA-SBR-10,823H is currently slated for reclamation and runs through three archeological sites.

4.4 Wilderness Experience

4.4.1 Proposed Action

The NPS proposal for developing equestrian trails in the Indian Cove area involves creating 5.05 miles of trail in designated wilderness, including a 1-mile section of the Former Boy Scout Trail, which already exists but is not an officially designated trail.

Conclusion: The opportunities for primitive riding and hiking through the wilderness areas surrounding Indian Cove would be enhanced by new trails. Joshua Tree National Park's 585,040 acres of wilderness would not be substantially compromised by 5.05 miles of combined new and rehabilitated historic trails.

4.4.2 Alternative A

An additional eastern loop of the proposed series of equestrian trails would be completed under this plan. Alternative A would result in a total of 6.75 miles of additional trail in wilderness, over the proposed action, including a 1-mile section of the Former Boy Scout Trail, which already exists but is not an officially designated trail.

Conclusion: The opportunities for primitive riding and hiking through the wilderness areas surrounding Indian Cove would be enhanced by new trails. Joshua Tree National Park's 585,040 acres of wilderness would not be substantially compromised by 6.75 miles of combined new and rehabilitated historic trails.

4.4.3 Alternative B

Alternative B, a reduction of the trails proposed by the NPS, would result in a total of 4.55 miles of new riding and hiking trail in designated wilderness areas, including a 1-mile section of the Historical Boy Scout Trail, which already exists but is not an officially designated trail.

Conclusion: The opportunities for primitive riding and hiking through the wilderness areas surrounding Indian Cove would be enhanced by new trails. Joshua Tree National Park's 585,040 acres of wilderness would not be substantially compromised by 4.55 miles of combined new and rehabilitated historic trails.

4.4.4 Alternative C, No Action

The no action alternative would not represent any net change to the wilderness experience in Joshua Tree National Park. Opportunities for primitive riding and hiking into the backcountry surrounding Indian Cove would remain restricted to the current Boy Scout Trail.

4.5 Scenic and Recreational Values

4.5.1 Proposed Action

The NPS proposal to develop and designate equestrian trails in the Indian Cove area would functionally add approx. 5.05 miles of new riding and hiking trails to an area of Joshua Tree National Park which currently provides visitors with access to 8 miles of riding trail and 8.6 miles of hiking trails. This new access would primarily be in the flats of Indian Cove, and would circle geologic formations and travel through washes, where desert microclimates would be available for visitors to experience.

Conclusion: The proposed action would benefit scenic and recreational values by providing additional access to park visitors in the flats of Indian Cove, an area where access is currently limited to off-trail use.

4.5.2 Alternative A

The alternative of developing a slightly larger trail network in the Indian Cove area would functionally add 6.75 miles of new riding and hiking trails to an area of Joshua Tree National Park which currently provides visitors with access to 8 miles of riding trail and 8.6 miles of hiking trails. This new access would primarily be in the flats of Indian Cove, and would pass by geologic formations and travel through washes, where desert microclimates would be available for visitors to see and experience. Equestrian groups have expressed a desire, during the lengthy public scoping process, for trail loops through which they can ride their animals. Alternative A presents one additional loop in the network of equestrian trails in the Indian Cove area.

Conclusion: The action proposed by Alternative A would benefit scenic and recreational values by providing additional access to park visitors in an area where access is currently limited to off-trail use. There would be slightly greater recreational opportunities than in the proposed action. Alternative A, however brings equestrian traffic closer to the parks proposed center for environmental learning (proposed by the potential incorporation of the additional lands adjacent to Indian Cove), and could potentially reduce the options

available for the new center.

4.5.3 Alternative B

The alternative of developing a more modest trail network in the Indian Cove area would functionally add 4.55 miles of new riding and hiking trails to an area of Joshua Tree National Park which currently provides visitors with access to 8 miles of riding trail and 8.6 miles of hiking trails. This new access would primarily be in the flats of Indian Cove, and would pass by geologic formations and travel through washes, where desert microclimates would be available for visitors to see and experience. Equestrian groups have expressed a desire, during the lengthy public scoping process, for trail loops through which they can ride their animals. Alternative B presents one fewer loop in the network of equestrian trails in the Indian Cove area.

Conclusion: The action proposed by Alternative B would benefit scenic and recreational values by providing additional access to park visitors in areas where access is currently limited to off-trail use. However, there would be fewer recreational opportunities than in the proposed action or Alternative A.

4.5.4 Alternative C, No Action

The no action alternative would not change the status of scenic and recreational values in the park.

4.6 Cumulative Impacts

4.6.1 Proposed Action

The long term impacts of each of the proposed impacts is largely unknown. Very little information is available on the impacts associated with linear equestrian use on designated trails on biotic and animal communities. Most of the available research is centered on the effects of dispersed livestock in desert environments. If the effect of a trail system is to limit impacts to the footprint of a designated trail system, the cumulative impacts of the proposed trial system will be low as compared with the historical dispersed use, and would likely reduce impacts to biotic communities. If the advent of a designated trail system dramatically increases the number of human visitors to the area, the associated impacts to the environment would be significantly higher.

Conclusion: The park would need to institute a monitoring program to determine the potential long term impacts of additional equestrian trails in the Indian Cove area. The park would need to identify, and monitor for changes in key environmental conditions that would trigger a re-evaluation of the trail system outlined in this EA. At the initiation of any of the actions, the park will monitor and evaluate the trail system for a period of 1 year following the completion of the trail system. The park will determine the level of use the trail system is receiving, and will identify any impacts associated with the use of the trails. The park will solicit input on the status of the project from the interested public. If substantial impacts are found to have occurred, the Superintendent may close all or parts of the new trail system. Data collected from the survey may be used as criteria to evaluate trails in other areas of the park. Substantial impacts may include (but not limited to) the presence or proliferation of exotic species (in comparison with areas where no trail exists), a marked reduction in the populations of species of concern, or the destruction of individual animals or burrows.

4.6.2 Alternative A

This action would provide for a greater amount of trails than the preferred alternative, and would likely generate cumulative impacts in a slightly greater area than the preferred alternative.

Conclusion: The park would need to institute a monitoring program to determine the potential long term impacts of additional equestrian trails in the Indian Cove area. The

park would institute a monitoring program as outlined in 4.6.1.

4.6.3 Alternative B

This action would provide for fewer trails than the preferred alternative, and would likely generate cumulative impacts in a slightly smaller area than the preferred alternative.

Conclusion: The park would need to institute a monitoring program to determine the potential long term impacts of additional equestrian trails in the Indian Cove area. The park would institute a monitoring program as outlined in 4.6.1.

4.6.4 Alternative C

The no action alternative. There would be no change from the current environment. No cumulative impacts would occur. The park would not need to monitor impacts of equestrian use in this part of the park. Dispersed use may continue to go undetected. Declines in park resources may go unnoticed.

4.7 Minimum Tool Analysis

4.7.1 Trail Construction

Where ever possible, trail construction will utilize primitive skills that are consistent with wilderness values. When greater than primitive skills are required, the work will be evaluated under the park's existing minimum tool evaluation process. The project will be evaluated by the park's Wilderness Steering Committee, an interdisciplinary team charged with ensuring that all actions taken in wilderness are consistent with wilderness values. The Wilderness Steering Committee will evaluate the proposed trail construction process, and will work with the park trail-crew foreman to ensure construction techniques that are consistent with wilderness values. All segments of the proposed trail are easily reachable via a short walk. No motorized equipment will be used unless expressly authorized by the Superintendent, after review by the wilderness steering committee. The area presents no major logistical challenges, and will require no overnight or extended stays during construction.

4.8 Summary of Impacts

4.8.1 Proposed Action

Natural Resources	Species of Concern	Cultural Resources	Visitor Enjoyment
<p>Designating additional trails for hikers and equestrians would reduce impacts associated with dispersed use, the condition of the resource prior to the 2000 implementation of the BC&W plan. Impacts would be confined to a hardened or defined trail tread. Corridors would use minimum impact strategies for travel and would follow natural terrain. Closure and restoration of trails not designated would reduce impacts. Existing social trails would be utilized wherever no other conflict with engineering, or other resources exists, to minimize new soil disturbances.</p> <p>This action would reduce the area that could be potentially reclaimed from social use by 5.05 linear miles. There are sensitive soil crusts in the area that will be disturbed through trail building activities. This would include approximately 5% of the total mileage of the trails. Soil crusts are well documented to reduce loss of soil due to wind and water erosion.</p>	<p>Confining horse use to designated trails would enhance desert tortoise protection above the pre-2000 implementation level, however it would offer less protection to the desert tortoise than prohibiting horse use all together. The direct impacts on tortoise from linear use along 5.05 miles of trail are largely unknown. Impacts may be dependent on additional use that the trail system might attract. There is currently insufficient data to project what level of use the proposed trail system may bring. The NPS will need to monitor trail use, and tortoise behavior to determine if equestrian use is impacting desert tortoise populations.</p> <p>There will be an increased potential for the introduction of exotic plants through horse manure left on trails. <i>Brassica tournefortii</i> has been identified as an exotic plant that poses a serious threat to desert tortoise habitat quality. Both <i>Bromus tectorum</i> and <i>B. rubens</i> have been identified as species introduced through horse activities that displace native annual plant species. Neither provide sufficient quality nutrients to tortoise diet as native annuals.</p> <p>Impacts of equestrian use on LeConte's Thrasher, a California Species of Concern, and other nesting birds are largely unknown.</p>	<p>There is a potential for the six sites lying in the proposed trail corridor to be impacted by trail construction and by casual use and erosion subsequent to increased use. The four sites in the APE may also be affected by casual use after trail designation.</p> <p>The NPS will need to conduct test excavations at directly impacted sites. Sites that are determined eligible to the National Register of Historic Places will be monitored during trail construction and periodically thereafter. Un-excavated sites in the APE will also be monitored periodically.</p>	<p>The proposed action would provide a wide variety of visitor experiences in wilderness and non-wilderness areas in the Indian Cove area. Hikers and equestrian users would gain access to 5.05 additional miles of developed trails and trail corridors not designated in the 2000 BC&W management plan. The reduction of social trails in the Indian Cove area would enhance the wilderness values of the area. Equestrian use along the narrow road shoulder would be greatly reduced, increasing safety and reducing equestrian and vehicle interactions.</p> <p>If conflicts between user groups or degradation of critical resources are noted, trails and corridors could be closed or trails could be rerouted.</p>

4.8.2 Alternative A

Natural Resources	Species of Concern	Cultural Resources	Visitor Enjoyment
<p>Designating additional trails for hikers and equestrians would reduce impacts associated with dispersed used, the condition of the resource prior to the 2000 implementation of the BC&W plan. Impacts would be confined to a hardened or defined trail tread. Corridors would use minimum impact strategies for travel and would follow natural terrain. Closure and restoration of trails not designated would reduce impacts. Existing social trails would be utilized wherever no other conflict with engineering, or other resources exists, to minimize new soil disturbances.</p> <p>Alternative A represents 6.75 miles of new trail not designated in the 2000 BC&W plan. This action would reduce the area that could be potentially reclaimed from social use by 6.57 linear miles. Also, this proposal adds additional trail engineering difficulties, as it traverses the Rattlesnake wash area. Equestrian use along the steep embankments of the wash could increase erosion.</p> <p>There are sensitive soil crusts in the area that will be disturbed through trail building activities. This would include approximately 5% of the total mileage of the trails. Soil crusts are well documented to reduce loss of soil due to wind and water erosion.</p> <p>trail building activities. This would include approximately 5% of the total mileage of the trails. Soil crusts are well documented to reduce loss of soil due to wind and water erosion.</p>	<p>Confining horse use to designated trails would enhance desert tortoise protection above the pre-2000 implementation level, however it would offer less protection to the desert tortoise than prohibiting horse use all together.</p> <p>The direct impacts on tortoise from linear use along 6.75 miles of trail are largely unknown. Impacts may be dependent on additional use that the trail system might attract. There is currently insufficient data to project what level of use the proposed trail system may bring. The NPS will need to monitor trail use, and tortoise behavior to determine if equestrian use is impacting desert tortoise populations.</p> <p>There will be an increased potential for the introduction of exotic plants through horse manure left on trails. <i>Brassica tournefortii</i> has been identified as an exotic plant that poses a serious threat to desert tortoise habitat quality. Both <i>Bromus tectorum</i> and <i>B. rubens</i> have been identified as species introduced through horse activities that displace native annual plant species. Neither provide sufficient quality nutrients to tortoise diet as native annuals.</p> <p>Impacts of equestrian use on LeConte's Thrasher, a California Species of Concern, and other nesting birds are largely unknown.</p>	<p>There is a potential for the seven sites lying in a the proposed trail corridor to be damaged by trail construction and by casual use and erosion subsequent to increased use. The segment of trail added to the proposed alternative in alternative A traverses Rattlesnake Wash, an area considered rich in cultural resources. Substantially more excavations would be required. The three sites in the APE may also be affected by casual use after trail designation.</p> <p>The NPS will need to conduct test excavations at directly impacted sites. Sites that are determined eligible to the National Register of Historic Places will be monitored during trail construction and periodically thereafter. Unexcavated sites in the APE will also be monitored periodically.</p>	<p>The proposed action would provide a wide variety of visitor experiences in wilderness and non-wilderness areas in the Indian Cove area. Hikers and equestrian users would gain access to 6.75 additional miles of developed trails and trail corridors not designated in the 2000 BC&W management plan. The reduction of social trails in the Indian Cove area would enhance the wilderness values of the area. The trail additions in alternative A would add 1.75 more mile of trail and would provide riders the opportunity for loop rides around several prominent features of the landscape. Equestrian use along the narrow road shoulder would be greatly reduced, increasing safety and reducing equestrian and vehicle interactions. If conflicts between user groups or degradation of critical resources are noted, trails and corridors could be closed or trails could be rerouted.</p>

4.8.3 Alternative B

Natural Resources	Species of Concern	Cultural Resources	Visitor Enjoyment
<p>Designating additional trails for hikers and equestrians would reduce impacts associated with dispersed used, the condition of the resource prior to the 2000 implementation of the BC&W plan. Impacts would be confined to a hardened or defined trail tread. Corridors would use minimum impact strategies for travel and would follow natural terrain. Closure and restoration of trails not designated would reduce impacts. Existing social trails would be utilized wherever no other conflict with engineering, or other resources exists, to minimize new soil disturbances.</p> <p>However, Alternative B represents 4.55 miles of new trail not designated in the 2000 BC&W plan. This action would reduce the area that could be potentially reclaimed from social use by 4.55 linear miles.</p> <p>There are sensitive soil crusts in the area that will be disturbed through trail building activities. This would include approximately 5% of the total mileage of the trails. Soil crusts are well documented to reduce loss of soil due to wind and water erosion.</p>	<p>Confining horse use to designated trails would enhance desert tortoise protection above the pre-2000 implementation level, however it would offer less protection to the desert tortoise than prohibiting horse use all together.</p> <p>The direct impacts on tortoise from linear use along 4.55 miles of trail are largely unknown. Impacts may be dependent on additional use that the trail system might attract. There is currently insufficient data to project what level of use the proposed trail system may bring. The NPS will need to monitor trail use, and tortoise behavior to determine if equestrian use is impacting desert tortoise populations. There will be an increased potential for the introduction of exotic plants through horse manure left on trails. <i>Brassica tournefortii</i> has been identified as an exotic plant that poses a serious threat to desert tortoise habitat quality. Both <i>Bromus tectorum</i> and <i>B. rubens</i> have been identified as species introduced through horse activities that displace native annual plant species. Neither provide sufficient quality nutrients to tortoise diet as native annuals. Impacts of equestrian use on LeConte's Thrasher, a California Species of Concern, and other nesting birds are largely unknown.</p>	<p>There is a potential for the three sites lying in the proposed trail corridor to be damaged by construction and by casual use and erosion subsequent to increased use. The two sites in the APE may also be affected by casual use after trail designation.</p> <p>Alternative B avoids the Rattlesnake wash area and removes five sites from the APE of the project. Fewer cultural resources would potentially be damaged by this proposal.</p> <p>The NPS will need to conduct minimal test excavations at the three directly impacted sites. If any of these sites are determined eligible to the National Register of Historic Places they will be monitored periodically. The two unexcavated sites in the APE will also be monitored periodically.</p>	<p>The proposed action would provide a wide variety of visitor experiences in wilderness and non-wilderness areas in the Indian Cove area. Hikers and equestrian users would gain access to 4.55 additional miles of developed trails and trail corridors not designated in the 2000 BC&W management plan. The reduction of social trails in the Indian Cove area would enhance the wilderness values of the area. The trail additions in alternative B would add 1.5 fewer miles of trail. Several prominent features of the landscape would not be accessible. Equestrian use along the narrow road shoulder would be greatly reduced, increasing safety and reducing equestrian and vehicle interactions.</p> <p>If conflicts between user groups or degradation of critical resources are noted, trails and corridors could be closed or trails could be rerouted.</p>

4.8.4 Alternative C, No Action

Natural Resources	Species of Concern	Cultural Resources	Visitor Enjoyment
<p>There would be no change from the current condition. The restrictions on Equestrian use as outlined in the BC&W management plan would remain in effect.</p> <p>Impacts to soils and vegetation would continue to expand along the road shoulder.</p>	<p>There would be no change from the current condition. The restrictions on Equestrian use as outlined in the BC&W management plan would remain in effect.</p> <p>Equestrian and tortoise interactions would be confined to the area adjacent to the existing road and already established trails.</p> <p>Impacts to the LeConte's thrasher and other nesting birds would be limited to current levels.</p>	<p>There would be no change from the current condition. The restrictions on Equestrian use as outlined in the BC&W management plan would remain in effect.</p>	<p>No additional trails would be added over those as outlined in the BC&W management plan. Equestrian users and hikers would gain no access to prominent features of the landscape. Equestrian would continue to use the narrow road shoulder to access park trails, greatly increasing the potential for equestrian and vehicle interactions.</p>

5 Consultation and Coordination

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5.2 Preparers and Consultants

Joshua Tree National Park

Biologist Jane Ashdown

Park Ranger (Interpretation) Michael Cipra

Geographic Information Systems Specialist Gary Lindberg

Park Ranger (Protection) Jimmy Pritchett

Superintendent Ernest Quintana

Biologist (Vegetation Specialist) Jane Rodgers,

Branch Chief of Cultural Resources Jan Sabala

Supervisory Park Ranger (Protection) Patrick Suddath

Chief of Interpretation Joe Zarki

EA Coordinator/Editor: Patrick Suddath

6 Appendices

6.1 U.S. Fish and Wildlife Species List (not included)

6.2 California Fish & Game, Species of Concern

(Edited to show species known or likely to occur at Indian Cove)

American White Pelican,	<i>Pelecanus erythrorhynchos</i>	Rare migrant
Northern Harrier	<i>Circus cyaneus</i>	Rare migrant
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Uncommon migrant, Rare in winter
Cooper's Hawk	<i>Accipiter cooperi</i>	Uncommon migrant, Rare resident
Golden Eagle	<i>Aquila chrysaetos</i>	Rare resident
Prairie Falcon	<i>Falco mexicanus</i>	Uncommon resident
Burrowing Owl	<i>Athene cunicularia</i>	Rare resident
Bendire's Thrasher	<i>Toxostoma bendirei</i>	Rare in summer
LeConte's Thrasher	<i>Toxostoma lecontei</i>	Uncommon resident
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Fairly common resident
Yellow Warbler	<i>Dendroica petechia</i>	Fairly common migrant
Yellow-breasted Chat	<i>Icteria virens</i>	Rare migrant
Sage Sparrow (Bell's)	<i>Amphispiza belli belli</i>	Status of A. belli belli is unknown in park, although sage sparrow's are fairly common i in winter.

6.3 Partners in Flight Watch List

Joshua Tree has the following species on list. Those found in the Indian Cove area are noted by an '(IC):'

Extremely High Priority

Bendire's Thrasher—rare breeder and summer resident

Bell's Vireo—casual vagrant

Lawrence's Goldfinch—irregular breeder and summer resident

Moderately High Priority

Elf Owl—extirpated, formerly rare breeder, CA state endangered species

Rufous Hummingbird—fairly common migrant (IC)

Lewis's Woodpecker—irregular migrant and winter resident

White-headed Woodpecker—casual migrant, winter

Oak Titmouse—fairly common breeder and year-round resident

LeConte's Thrasher—uncommon breeder and year-round resident (IC)

California Thrasher—uncommon breeder and year-round resident (IC)

Lucy's Warbler—rare migrant

Hermit Warbler—uncommon migrant (IC)

Black-chinned Sparrow—fairly common breeder and summer resident, very localized (IC)

Harris' Sparrow—casual migrant, winter

Moderate Priority

Allen's Hummingbird—casual migrant

Gray Vireo—rare breeder and summer resident

Sage Sparrow—fairly common winter resident (IC)

Brewer's Sparrow—uncommon breeder, common migrant, fairly common winter resident (IC)

7 Figures

Figure 1 — Planning Segments Map

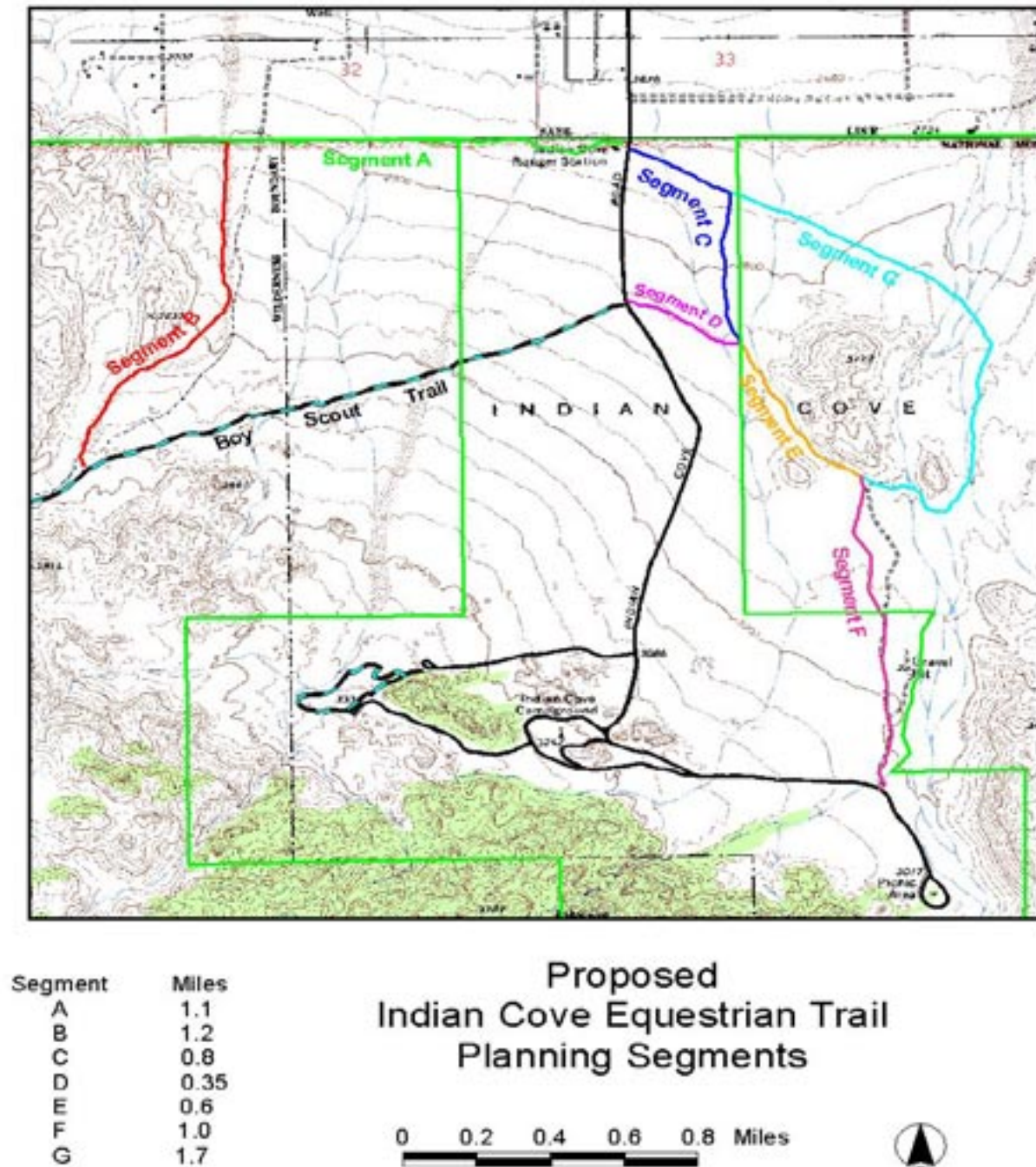
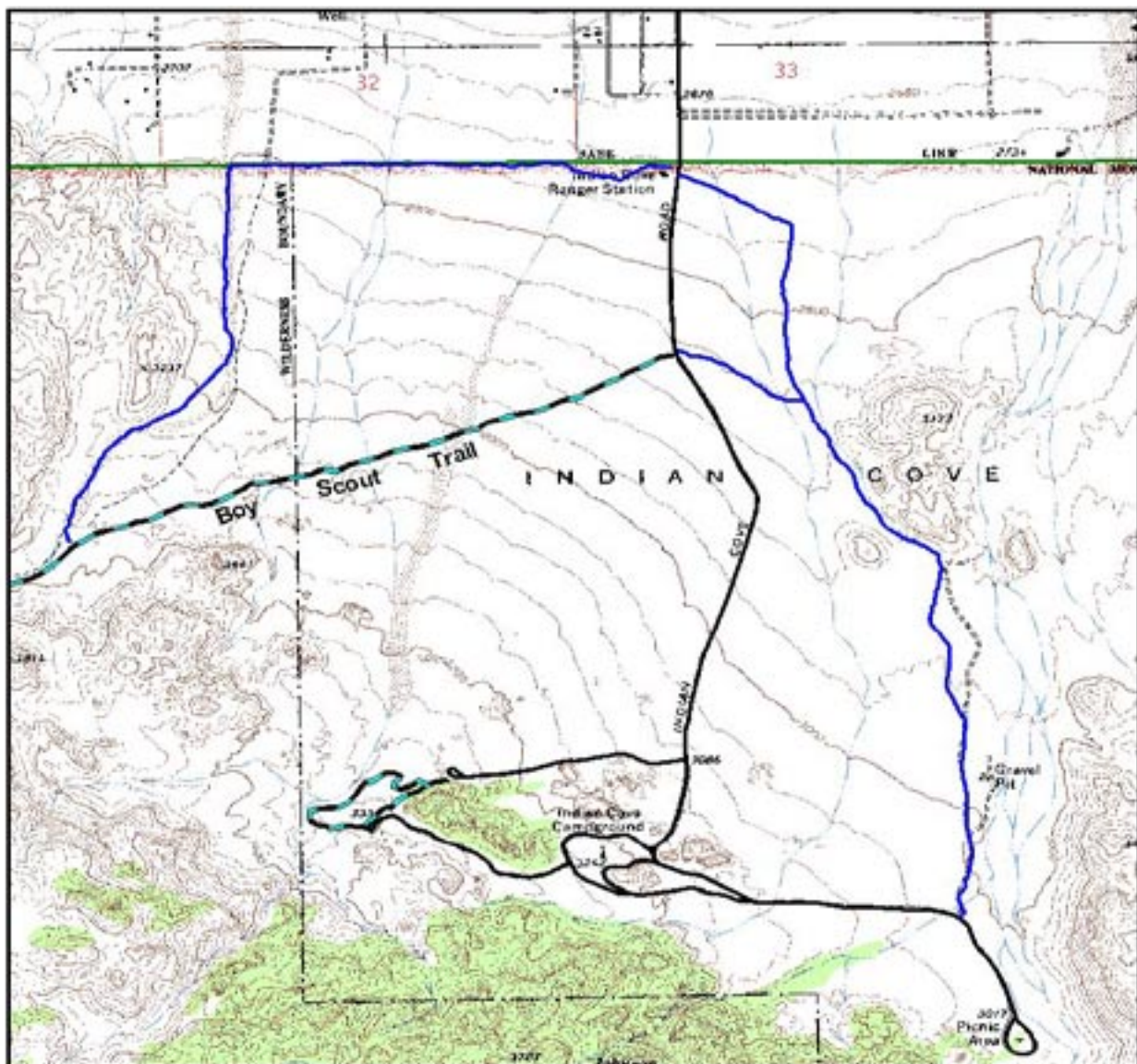


Figure 2 — Proposed Action



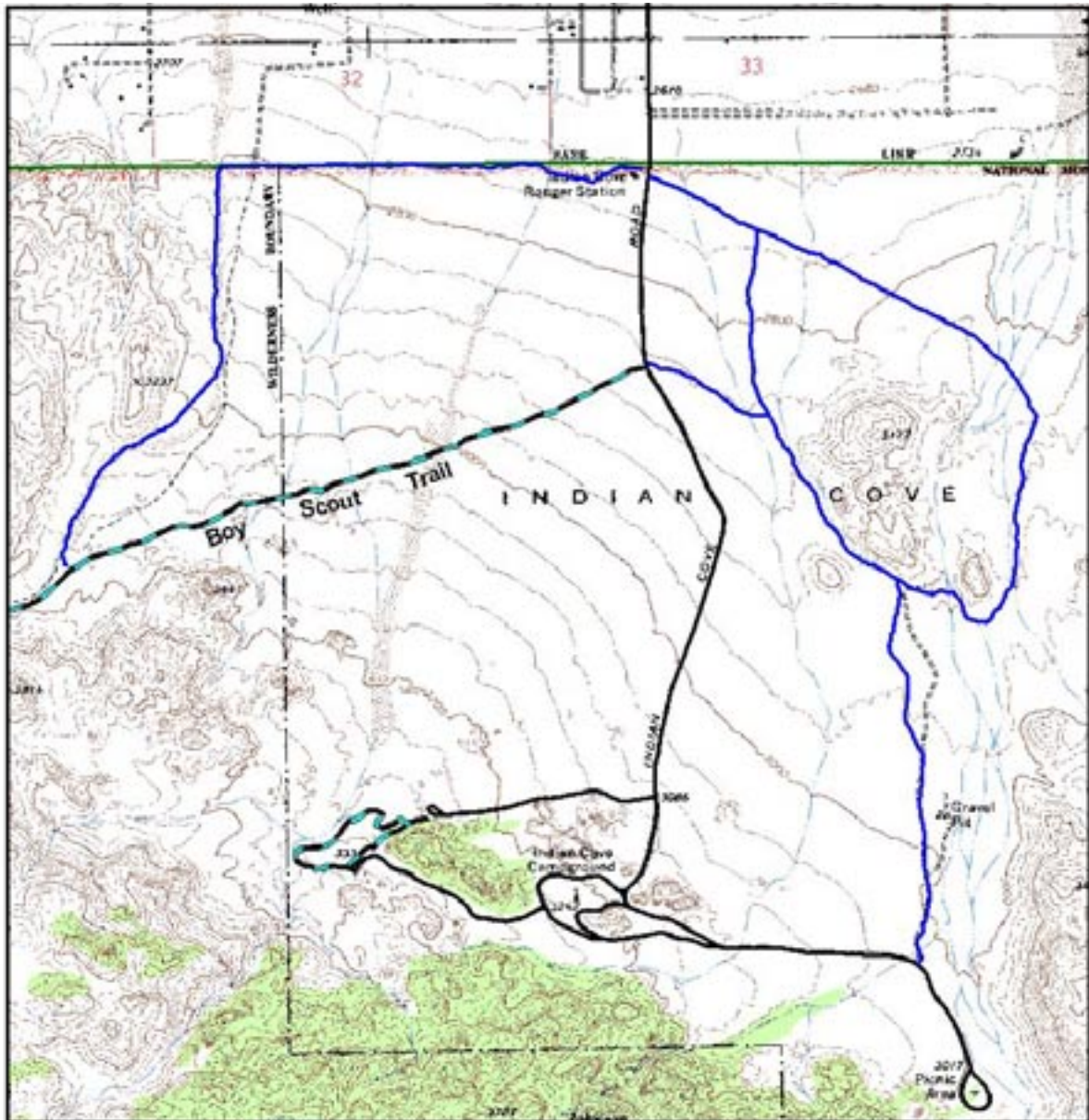
Proposed
Indian Cove Equestrian Trail
Preferred Alternative

5.0 Miles of
New Trails
Shown In **BLUE**

0 0.25 0.5 0.75 1 Miles



Figure 3 — Alternative A



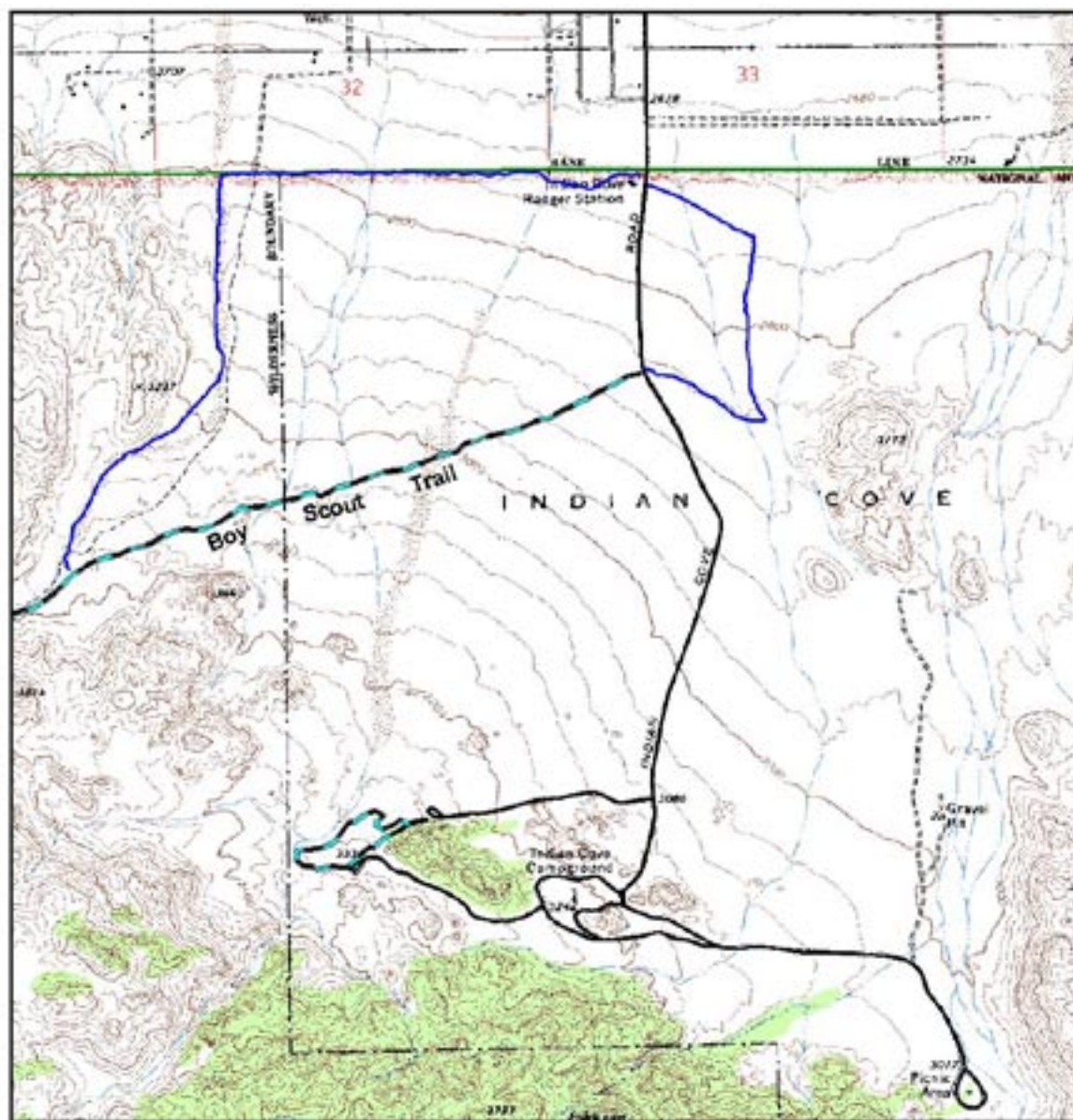
Proposed
Indian Cove Equestrian Trail
Alternative A

6.75 Miles of
New Trails
Shown In **BLUE**

0 0.25 0.5 0.75 1 Miles



Figure 4 — Alternative B

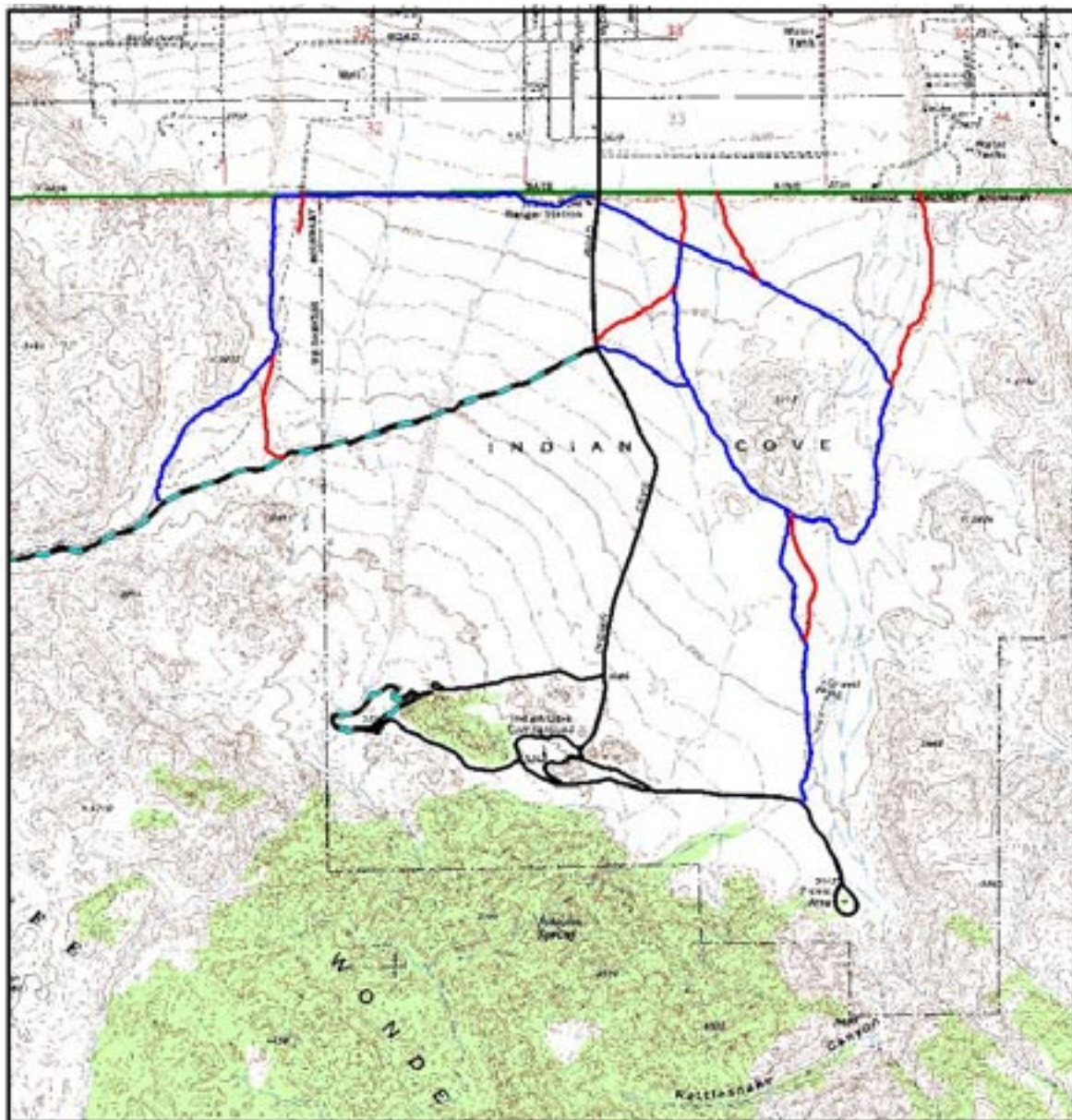


Proposed
Indian Cove Equestrian Trail
Alternative B

3.45 Miles of
New Trails
Shown In **BLUE**



Figure 5 — Social Trails



Proposed
Indian Cove Equestrian Trail
Social Trails To Be Removed

2.56 Miles of
Social Trails
Shown In **RED**

0 0.2 0.4 0.6 0.8 Miles



Figure 6 — Tortoise Survey

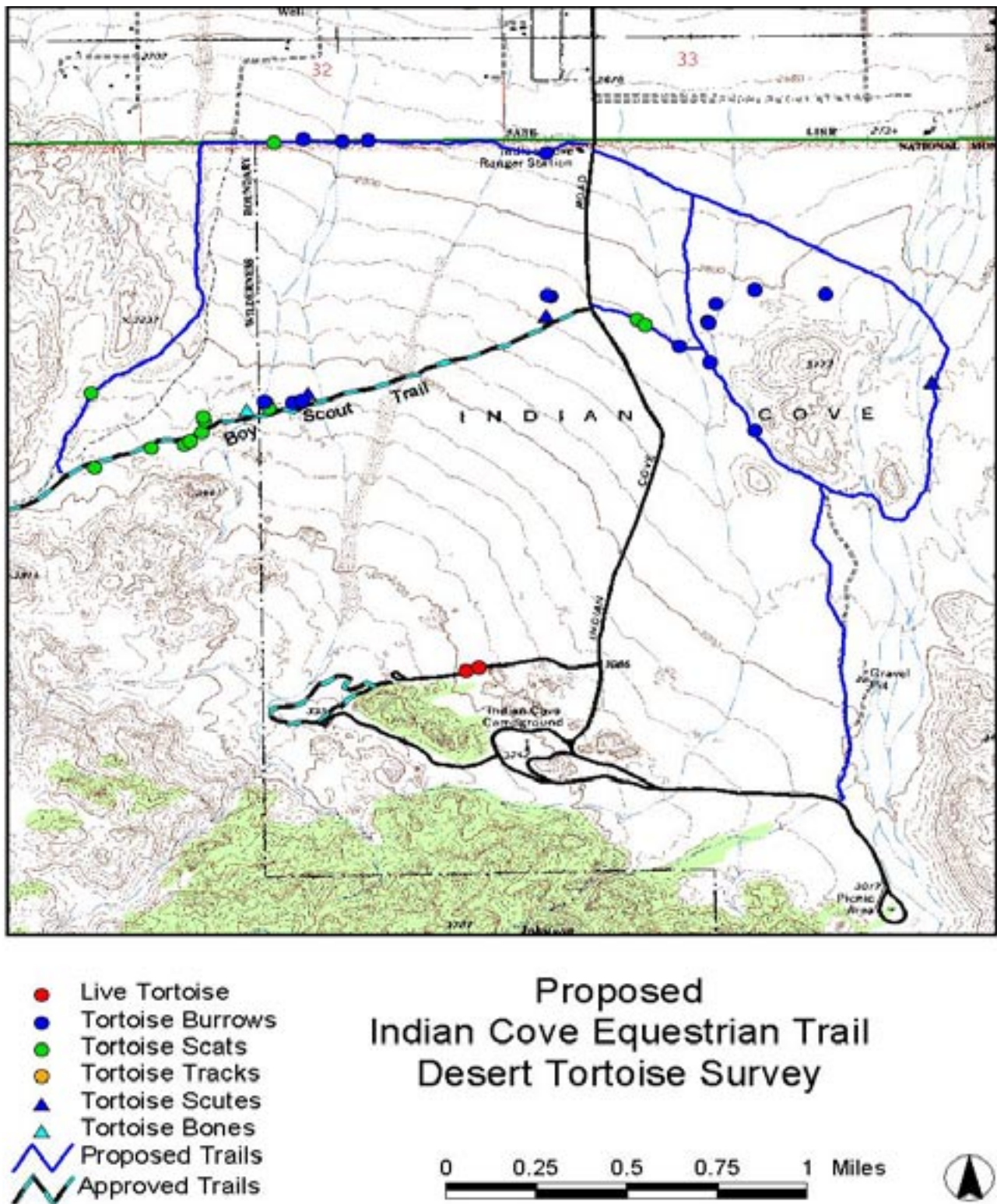
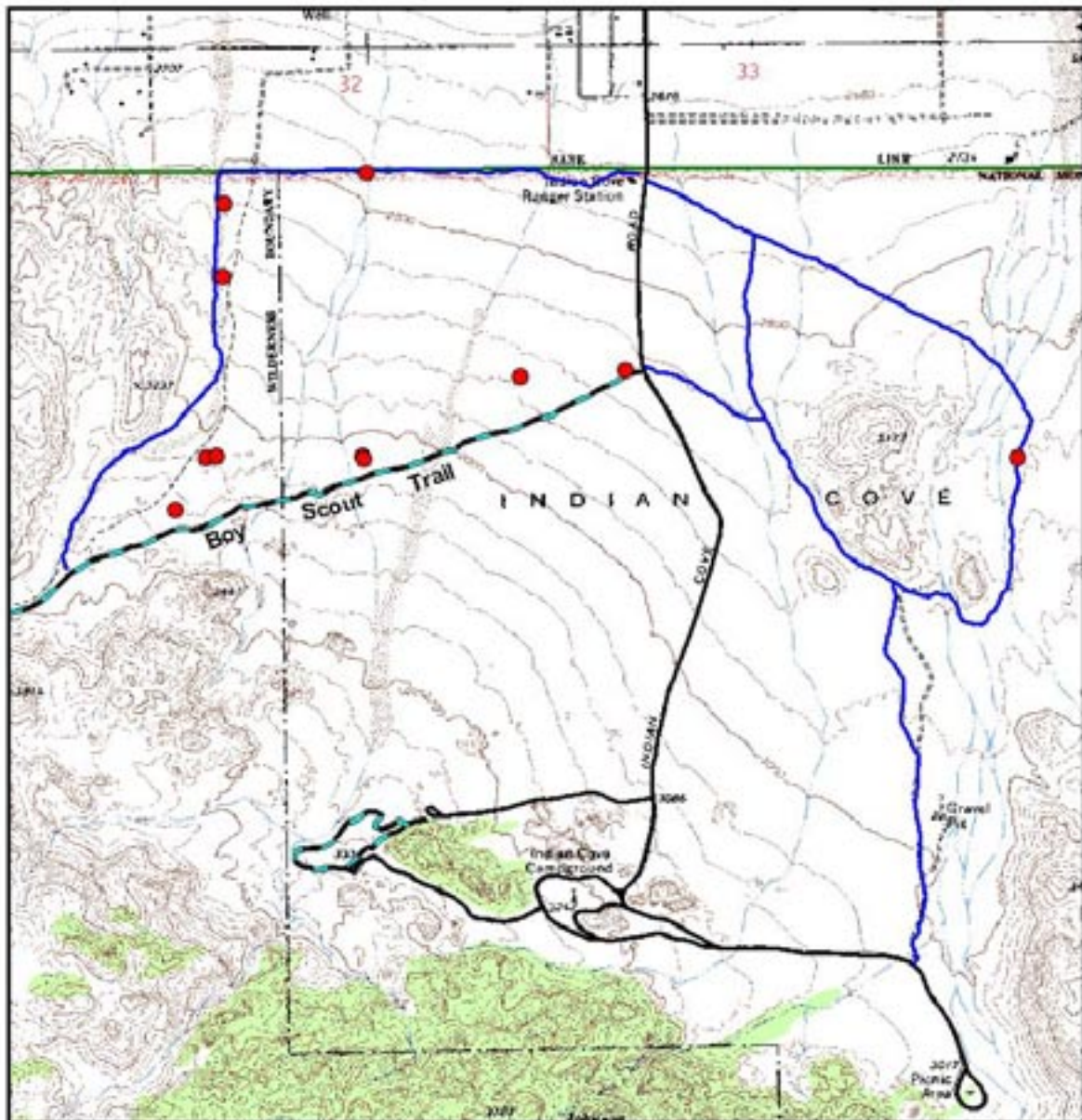


Figure 7 — LeConte's Thrasher Survey



Proposed
Indian Cove Equestrian Trail
Le Conte's Thrasher Survey

RED Dots are
Nest sites

Trails Shown
In BLUE

0 0.25 0.5 0.75 1 Miles

